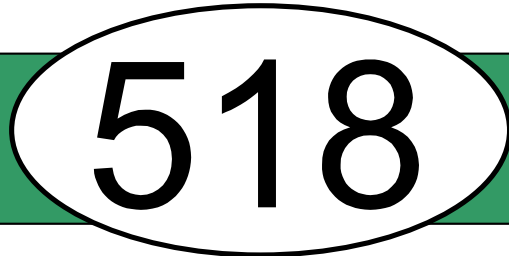


# Route Development Plan

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RDP/EA

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# **I. TECHNICAL SUMMARY**

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The SR 518 Route Development Plan (RDP) documents the creation of a long-range plan for the SR 518 corridor located in King County, Washington. An RDP is intended to provide a long-range plan for a specific transportation facility, setting forth a conceptual framework for future improvements. It allows local and regional governments to efficiently plan project implementation and construction over a twenty-year planning horizon.

The SR 518 RDP comprises an understanding of transportation conditions and needs within the corridor. Recommended improvements are identified at locations in the corridor in response to the needs identified. The RDP is the initial step in implementation of the recommended concepts, and subsequent detailed analysis, independent environmental review, and concept refinement would be conducted prior to implementation of any of the concepts recommended.

## **1.1 PURPOSE AND NEED**

The purpose of the SR 518 Route Development Plan is to identify infrastructure and other related improvements necessary to reasonably accommodate forecast traffic growth, improve traffic operations on the SR 518 corridor, and provide adequate access to the Seattle-Tacoma International Airport and the surrounding communities of Burien, SeaTac, and Tukwila.

Improvements to the SR 518 corridor are necessary to correct the existing operating inefficiencies and to accommodate projected growth in the surrounding community over the next 20 years. Traffic in the study area is forecast to increase significantly due to growth in the adjacent communities as well as at Sea-Tac Airport. A planned extension of SR 509 south to I-5, coupled with the development of a South Airport Expressway, will also affect demand on the SR 518 corridor.

## **1.2 FACILITY DESCRIPTION**

SR 518 is a 3.8 mile limited access freeway that travels east-west through the cities of Tukwila, SeaTac, and Burien, and also serves as the primary access route to the Seattle-Tacoma International Airport. The facility generally consists of two eastbound and three westbound lanes between I-5 and SR 99; two lanes in each direction between SR 99 and the western North Airport Expressway (NAE) ramps; three lanes in each direction between NAE and Des Moines Memorial Drive (DMMD), and two lanes in each direction between DMMD and SR 509. The facility has two signalized intersections at its western terminus at the SR 509 ramps, but full access control from that point east. A study area map is presented in Figure TS-1, identifying the route with beginning and ending mileposts and showing the approximate analysis area.

## **1.3 RECOMMENDED CONCEPTS**

Evaluation of forecast traffic conditions indicates that the primary needs on SR 518 are largely isolated to the corridor interchanges. Concepts were therefore developed for each interchange area, and assessed for their potential to address the operational needs identified in the corridor. The concepts were evaluated based on criteria that were derived directly from the identified goals and objectives for the study. Criteria used in the evaluation of concepts include mobility

and accessibility; accommodation of 2025 travel demand; safety; compatibility with relevant plans and proposed projects, and avoidance of constraints and minimization of detrimental effects to the natural and built environments (See Figure TS-2). Additionally, the ability for projects to be implemented in a phased approach was considered, as was the independent utility of each concept.

Recommendations identified for the SR 518 Route Development Plan as related to each interchange are presented in the following sections.

### **1.3.1 SR 509 Interchange**

The existing interchange with SR 509 is located at the far western end of the SR 518 corridor. The interchange includes two at-grade intersections on the SR 518 mainline, and is the only segment of SR 518 that is not fully access controlled. Only westbound-to-northbound, and northbound to eastbound movements are accommodated by direct, limited access ramps, with all other movements (including mainline SR 518) passing through one or both of the signalized intersections.

The recommended concept at this location is a hybrid combination of limited access and local connections through a single interchange (See Figure TS-3). The primary component of the recommended concept is to provide a freeway-to-freeway ramp to serve the southbound SR 509 to eastbound SR 518 movement, which is the highest volume movement not currently served with limited access ramps (Currently, this movement passes through two signalized intersections). This new ramp would compliment the existing direct ramp from westbound SR 518 to northbound SR 509, providing full directional connections to/from the north. Review of geometric feasibility found that the ramp could be constructed to either pass under SR 518, then turn and fly-over SR 509; or instead could pass under both facilities. Either variation would keep the profile at or below the elevation of the existing facilities at the interchange. This would minimize view impacts, as well as preserve the opportunity for an eventual west to south freeway-to-freeway direct connection, should such a connection be deemed necessary at some future time. The west to south ramp is not included in the recommended concept at this time, but the opportunity to provide it as a component to the ultimate build-out of this interchange should be maintained.

Access to and from Burien would continue to be provided through intersections at the end of the SR 518 alignment. This access could be improved in one of two ways:

- *A modest reconfiguration of the exiting intersections.* This would involve maintaining use of the existing overpass and ramp structure, modifying the signalized intersections (since the southbound to eastbound left turn would instead be accommodated by the proposed new ramp, this phase could be removed), and instituting channelization and streetscape elements to reinforce the transition from freeway to arterial. These elements could not be constructed until after the proposed direct SB-EB ramp was implemented.
- *Replace existing interchange with a Single Point Urban Interchange (SPUI).* This option would involve replacing the two current intersection with a new SPUI intersection. The primary benefits of the SPUI are increased storage for westbound-southbound left turns; further distancing the interchange intersection(s) from the heavily congested S 148<sup>th</sup> St/1<sup>st</sup> Ave S intersection in Burien; and consolidation of signalized turns to a single location. This component could be phased (constructed either ahead of or after the

proposed direct SB-EB ramp, though if it were constructed afterward, the SB-EB leg of the SPUI would not need to be constructed.

Realization of the proposed hybrid would require:

- Initiation of an environmental analysis and design process for the interchange, including the need for an access decision report as required by WSDOT.
- If the option to construct a SPUI interchange were selected as part of the overall interchange concept, with a single intersection on SR 518 serving crossing ramp movements, minor realignment of all ramps leading to the interchange would be required. *Note: No southbound-to-eastbound ramp would be required on the SPUI if it is constructed concurrent with or after the proposed flyover ramp that serves the same movement.*
- Construction of a direct-connection ramp from southbound SR 509 to eastbound SR 518 completing the freeway-to-freeway access couplet to and from the north. The likely alignment for this ramp would be to cross under SR 518, and then climb and cross over SR 509, connecting to EB SR 518. Alternatively, this ramp could be constructed to fly-under both roadways. Either option could be concealed from existing sight lines in the City of Burien by using the grades on SR 509 advantageously.
- Potential modification of signal operations at S 148<sup>th</sup> Street and along 1<sup>st</sup> Avenue S. to better accommodate access to Burien from southbound SR 509.

The recommended concept should be designed and constructed so that a gateway concept, as proposed by the City of Burien, can be accommodated.

### **1.3.2 Des Moines Memorial Drive Interchange**

The Des Moines Memorial Drive (DMMD) interchange is located in close proximity to the SR 509 interchange (0.6 miles to the east) . Access at the DMMD interchange is currently provided to and from the east only. Traffic operations are currently acceptable, and are forecast to continue to be so throughout the RDP horizon. The DMMD concepts considered range from completing full access in all directions, to removing all access at this location.

Based on the projected demand characteristics of the Des Moines Memorial Drive interchange anticipated in the year 2025, the environmental constraints in the immediate vicinity, and the potential secondary impacts of improvements at the interchange, the No Action concept is recommended for inclusion in the RDP (See Figure TS-4). Selection of this concept does not limit the ability to improve access at this location in the future, should demand increase beyond that anticipated by the 2025 RDP design year. Furthermore, recommendation of the No Action concept for the DMMD interchange as part of the RDP recognizes that improved access can be achieved at the 24<sup>th</sup> Avenue S interchange, which is an area of fewer constraints and greater transportation demand.

### **1.3.3 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street/Airport/SR 99**

The central portion of the SR 518 corridor is currently served by a partial diamond interchange (to and from the west) at S 154<sup>th</sup> Street, and a combination of ramps at SR 99 that provide

access to and from the east. The SR 99 ramps are also integrated with ramps providing access to the Seattle-Tacoma International Airport in the westbound direction.

A wide range of initial concepts were developed for this interchange area in an effort to improve traffic circulation, minimize traffic and environmental impacts (arterial and freeway), and increase accessibility to surrounding land uses. The initial concepts were reviewed to gauge feasibility and potential constraints, traffic characteristics, and geometric considerations (including interchange spacing and added access). A refined set of concepts were developed that generally involved relocating the S 154<sup>th</sup> St ramps to 24<sup>th</sup> Ave S, reconfiguring the SR 99 ramps, and providing full access through frontage road connections between the sets of ramps.

The RDP recommends that two concepts move forward for further, more detailed evaluation during the environmental assessment process. The two variations (Figure TS-4) recommended for further study are described below.

### **SPUI CONCEPT**

The primary component of this concept is a Single-Point Urban Interchange (SPUI) at SR-99. The SPUI's ramps would tie into existing ramp diverge/merge points, or directly into other ramps, to avoid adding additional access points to the SR 518 mainline. A half diamond interchange would be constructed to/from the west at 24<sup>th</sup> Ave S, replacing the existing S 154<sup>th</sup> St ramps. Additionally, a westbound connection could be made from the NAE to 24<sup>th</sup> Ave S, so that 24<sup>th</sup> Avenue S would have access *from* the east. Access to the east would need to be made via arterial access to the SR 99 interchange, initially. An optional second phase could complete access to the east from 24<sup>th</sup> Ave S by constructing a ramp to the eastbound NAE ramps. Because of roadway geometric requirements, this option could not be implemented until selected other improvements are made downstream, including a third eastbound lane on SR 518 and new connection to I-5 North (as described under the Tukwila Interchange improvements in section 1.3.4).

### **SPLIT DIAMOND WITH LOOP RAMP**

This option involves a combination split diamond interchange at SR 99 (to/from the east) and 24<sup>th</sup> Ave S (to/from the west). The existing loop ramp serving WB to SB movements at SR-99 would be maintained (though improved) to eliminate the need for a new signalized intersection in close proximity to the SR-99/S 154<sup>th</sup> St intersection. Frontage roads would connect the two half interchanges. Northbound traffic on SR-99 destined for westbound SR 518 would need to use S 154<sup>th</sup> Street to access a slip ramp onto the new interchange system.

## **1.3.4 Tukwila Interchange**

The Tukwila Interchange forms the eastern terminus of the SR 518 corridor, where connections are made to I-5 and I-405. The interchange is a complex, full freeway-to-freeway interchange, which includes partial HOV connections between I-405 and I-5. Some existing geometric elements are unfavorable, as several ramps enter or exit the roadway on the left side, and the eastbound mainline of SR 518 necks down to a single lane prior to joining I-405. Additionally, an unstable hillside abuts SR 518 to the south, limiting the potential for expansion or realignment in that direction. Due to their proximity, the ramps to S 51<sup>st</sup> Street were studied as an integral part of the Tukwila interchange.

A variety of concepts were developed to address operational inefficiencies and non-standard geometric elements, as well as provide for an eventual lane-balanced transition once the proposed I-405 corridor improvements are implemented. The recommended route development concept for the Tukwila Interchange combines most of these screened concepts into a single concept that can be established incrementally (See Figure TS-6). This allows the improvements to be staged to complement construction of the major corridor improvements proposed for the I-405 corridor.

The recommended concept for the Tukwila Interchange includes the following components:

1. Continuation of the inside eastbound lane through the Tukwila interchange, connecting with the add-lane now provided at Andover Park, to maintain two lanes through the entire interchange area. This improvement could be completed in the near-term as a possible transportation systems management (TSM) project.
2. Relocate the left-side eastbound SR 518 to northbound I-5 ramp to the right side of SR 518; consider combining with the eastbound to southbound ramp as a single I-5 exit, coordinated with 51<sup>st</sup> Avenue S. Reserve the existing left-hand exit for a potential high occupancy vehicle (HOV) direct access ramp to northbound I-5. This ramp could fly over the entire interchange and reconnect on the right side of I-5, or could instead pass under the interchange and continue to connect to the left side of northbound I-5. The latter option would allow the ramp to continue to provide combined HOV and general-purpose traffic with direct access to the northbound I-5 HOV lanes as well.
3. Construct a third eastbound lane on SR 518 from either the eastbound on-ramp from the Airport North Access Expressway (NAE) or SR 99 to the newly realigned I-5 ramp. Addition of this lane must occur concurrent with or after the realignment of the eastbound SR 518 to northbound I-5 ramp from the left- to the right-hand side.
4. Addition of auxiliary lanes as appropriate to achieve lane balancing with the proposed I-405 Corridor Improvements, as well as address the distribution of demand. This would include additional lanes being added to the westbound to southbound ramp (one additional lane), westbound to northbound ramp (one additional lane), and northbound to eastbound ramp (resulting in an add-lane instead of merge-lane).

### **1.3.5 Transportation Systems Management**

A stand-alone transportation systems management (TSM) concept is not anticipated to be viable within the SR 518 corridor due to the fact that many potential TSM and transportation demand management techniques typically available are incorporated into the defined No Action or various recommended improvement concepts. TSM applications contained in, or complimentary to, the recommended concepts include:

- **Signal Synchronization:** Synchronization of signals whenever possible would be an important aspect to maximizing operations for any concept. Locations that could potentially benefit from synchronization of traffic signals are (1) the SR 509 interchange with the signal at 1st Avenue S/SW 148th Street; and (2) existing or proposed signalized intersection in the S 154th Street, 24th Avenue S and SR 99 corridors proximate to the recommended interchange improvements.

- **Ramp Metering:** On-ramp metering is not recommended for application on the west end of the corridor, where mainline and arterial demand characteristics at Des Moines Memorial Drive do not indicate a need. Ramp metering could potentially provide some system benefit to the freeway mainline at the S 154th Street/24th Avenue S and SR 99 interchanges, though holding capacity of the ramps and impacts on the surrounding arterials could be problematic. Additionally, potential integration of these ramps with the NAE ramps may preclude ramp metering. At 51st Ave S, ramp metering could benefit the freeway by regulating the flow onto the eastbound mainline immediately downstream from the on-ramp from southbound I-5.
- **Channelization Applications:** Improved channelization to provide left-turn pockets could benefit traffic operations in a number of locations, including S 154th Street for eastbound traffic accessing the westbound on-ramp. Additionally, a restriction on left-turns from westbound SR 518 traffic onto First Avenue S for traffic coming off of the southbound ramp at the SR 509 interchange would greatly reduce weaving and improve safety in this interchange area. Utilization of the interchange to the north at S 146th Street is recommended instead for traffic destined to southbound 1st Avenue South. Appropriate signage would be required to support this policy restriction.
- **Lane Continuity and Balancing:** The additional eastbound lane on SR 518 proposed between the I-5 off-ramps and Andover Park W may be considered a TSM component in that its primary benefit is to improve the operations on the existing two-lane segments to the east and west.
- **Improved Signage:** Potential applications of improved signage could benefit operations throughout the corridor. Early, clear direction for airport-bound traffic would help distribute traffic into appropriate lanes while minimizing driver confusion and indecision. Identification of SR 509 as an alternate route into Seattle could help establish a more balanced travel pattern that better uses available capacity in the SR 509 corridor (currently, it is signed for access to Burien only and not Seattle). Signage directing southbound SR 509 traffic bound for southbound First Avenue S to use the S 146th Street exit would reduce confusion at the S 148th Street/First Ave S intersection, as well as reduce demand at the SR 509/SR 518 interchange.
- **Transit Accommodation:** A new Sound Transit LINK park-and-ride station at SR 99, along with fully developed transit plans for the area are already components assumed in the No Action for the corridor.

### 1.3.6 HOV Analysis

A conceptual-level analysis was conducted to determine the potential need for, and feasibility of HOV facilities in the corridor. A screening process compared potential HOV system characteristics of SR 518 with thresholds established by WSDOT's HOV System Policy. Existing and potential HOV demand, overall traffic volumes, corridor capacity, travel patterns, and system continuity were considered. Additionally, a screening analysis was performed to determine operational, physical, and cost feasibility for mainline HOV lanes on SR 518.

Due to unique physical and operating conditions, three sections of the corridor were considered for HOV improvements separately: the western half of the facility (SR 509 to Airport), the eastern half of the facility (Airport to I-5), and the Tukwila interchange.

The western portion of the corridor did not show a strong need for, nor substantial benefit resulting from, HOV facilities. HOV facilities on this segment would not provide a significant travel time advantage over the general purpose lanes, nor would they be expected to receive a high degree of use. The eastern portion of the corridor showed a higher degree of potential need, based on forecast traffic volumes and roadway operating characteristics. However, severe physical constraints were deemed to be a significant challenge to implementing mainline HOV improvements between the airport and I-5. These included a limited opportunity for expanding SR 518 to accommodate additional (HOV) lanes, and the inability to accommodate direct HOV movements at both the Tukwila and SR 99/NAE interchanges in tandem.

HOV improvements considered at the Tukwila interchange would focus effort on supporting the transition to and from existing HOV facilities on I-5 and I-405. Several concepts were developed for an eastbound to northbound HOV ramp. The recommended re-alignment of the eastbound to northbound left-hand general purpose ramp to the right side of SR 518 will potentially leave an eastbound to northbound inside-to-inside direct ramp vacant. This ramp could be used for authorized HOV access to I-5 (Note: to maintain acceptable levels-of-service on SR 518 and avoid reintroduction of a weave movement, access would likely be restricted to authorized vanpools and transit).

Concepts were also developed for the southbound to westbound movement. Lack of direct access from the HOV lanes on I-5 to SR 518 requires that HOV traffic on I-5 merge across five lanes of traffic in order to access the SR 518 off-ramp. A further consideration is that HOV traffic should be positioned on the outside of the SR 518 mainline, so that access to the airport and other locations does not require further weaving.

Given these challenges, improvements for HOV connections between I-5 and SR 518 might best be accommodated on I-5, upstream of the Tukwila interchange. Concepts considered to accommodate such a movement include; (1) a southbound to westbound fly-over ramp provided off of the existing southbound HOV through lane, linking up with the existing southbound to westbound GP ramp; and (2) a flyover ramp further upstream (possibly at SR 599) to transition airport bound HOVs from the center I-5 HOV lanes to the outside general-purpose lanes so that they can use the existing or reconfigured general purpose ramps to SR 518. However, these concepts were not evaluated as to their constructability and require a separate planning and engineering process to develop further.

These HOV recommendations for HOV facilities are consistent with the recommendations presented in the Puget Sound HOV Pre-Design Studies Final Report (May 5, 1997), which did not recommend HOV lanes on the SR 518 mainline, but did recommend a new direct HOV connection between SB I-5 and SR 518. The RDP recommendations modify the Puget Sound recommendation only by additionally recommending that the complementary access (EB to NB I-5) be provided as well if general-purpose access is moved to the right side of I-5. Also, the RDP suggests that SB I-5 direct access may be more easily implementable, and more effective, if it instead focuses on moving HOVs to the right side general purpose off ramp, so that HOVs are lined up for the SR 99 and Airport exists downstream on SR 518. (Note: No recommendation was made related to the existing westbound to northbound HOV direct connection ramp within the Tukwila Interchange. Future consideration of connecting this direct ramp into the center HOV facility of northbound I-5 should be considered, but was not evaluated as part of this analysis.)



## **1.4 OPINION OF COST**

An opinion of cost was prepared for the recommended concepts. These costs are for order of magnitude planning purposes only, and do not represent engineering-level estimates. They are for capital costs only and do not include right-of-way purchase, environmental mitigation, WSDOT expenses, legal fees, financing, project inflation to construction time, or operating and maintenance costs. The opinion of costs for recommended improvements to the SR 509, 24<sup>th</sup> Avenue S/SR 99, and Tukwila interchanges are presented in Table TS-1.

## **1.5 NEXT STEPS**

The Route Development Plan represents the first step in establishing a long range vision for the SR 518 Corridor. Recommendations for interchange improvements included in the plan are identified as independent projects. As each interchange recommendation moves towards possible implementation, a detailed environmental documentation process is needed for each. Likewise, several of the recommendations present options that require evaluation during the independent environmental process and preliminary engineering for each interchange.

Furthermore, changes or modifications to existing access points require a formal access decision report be completed. Access decision reports are required by the Federal Highway Administration (FHWA) anytime changes in access to federal interstates are being considered. In the SR 518 corridor, proposed modifications to the Tukwila Interchange would require coordination with and approval by FHWA.

Additionally, WSDOT also requires that access decision reports be developed for modifications to access to/from WSDOT identified freeways. Both SR 518 and SR 509 are identified WSDOT freeways. Changes to the access at SR 99, South 24<sup>th</sup>/154<sup>th</sup> Streets, Des Moines Memorial Drive, and the SR 509/SR 518 interchange require coordination with and approval by WSDOT's State Design Engineer.

### **SR 99-South 24<sup>th</sup>/154<sup>th</sup> Street Interchange Environmental Assessment**

The Seattle-Tacoma Airport/Port of Seattle has requested access improvements in the Vicinity of the existing SR 99-South 24<sup>th</sup>/154<sup>th</sup> Street interchanges. This request was the genesis for recommendations reflected in the Route Development Plan for the central portion of the SR 518 corridor. Through an intergovernmental agreement between the Port of Seattle and the WSDOT, funding for an environmental assessment of the proposed RDP recommended improvements in the central portion of the SR 518 Corridor have been identified. Because these improvements have been identified as independent of the other improvements recommended within the SR 518 corridor, an environmental process has been initiated to allow potential advancement of improvements to these interchanges. This work will be completed in accordance with NEPA/SEPA requirements for environmental assessments (EA). Scoping for the EA was initiated in October 2001 and anticipated results from the environmental process are anticipated in the fall of 2002.

# **Table TS-1** **Summary Opinion of Costs** **for Recommended Concepts**

Interchange Concept	Year 2001 \$	
<b>SR 509 Interchange</b>		
SPUI (Optional)	\$	30,400,000
Tunnel/Flyover		20,200,000
<b>Total</b>	<b>\$</b>	<b>50,600,000</b>
<b>24th Avenue S - SR 99 Interchange</b>		
<b>(Split Diamond with Loop option)</b>		
24th Avenue S Configuration	\$	22,300,000
Local Widening of SR 518		4,700,000
SR 99 Configuration		33,100,000
Two-Way Frontage Road		10,200,000
<b>Total</b>	<b>\$</b>	<b>70,300,000</b>
<b>(SPUI and Half Diamond, Phased)</b>		
<b>Phase I</b>		
24th Avenue S Configuration	\$	19,000,000
North (WB) CD Ramp (w/ Slip Ramp from S 154th St)		5,400,000
South (EB) Ramp		3,800,000
SR 99 Configuration (SPUI)		29,800,000
<b>Total</b>	<b>\$</b>	<b>58,000,000</b>
<b>Phase II</b>		
South (EB) CD Ramp (24th to NAE)	\$	19,000,000
<b>Total</b>	<b>\$</b>	<b>19,000,000 *</b>
<i>*Cost does not include widening to SR-518, which would be required prior to implementing phase II. Costs for widening SR 518 are shown under the Tukwila Interchange concept below.</i>		
<b>Tukwila Interchange</b>		
Widening of SR 518, SR 99 to Tukwila Interchange	\$	4,700,000
Widening of SR 518 through Interchange		5,200,000
Modifications to Tukwila Interchange (Right-side exit)		43,800,000
<b>Total</b>	<b>\$</b>	<b>53,700,000</b>

## **Notes**

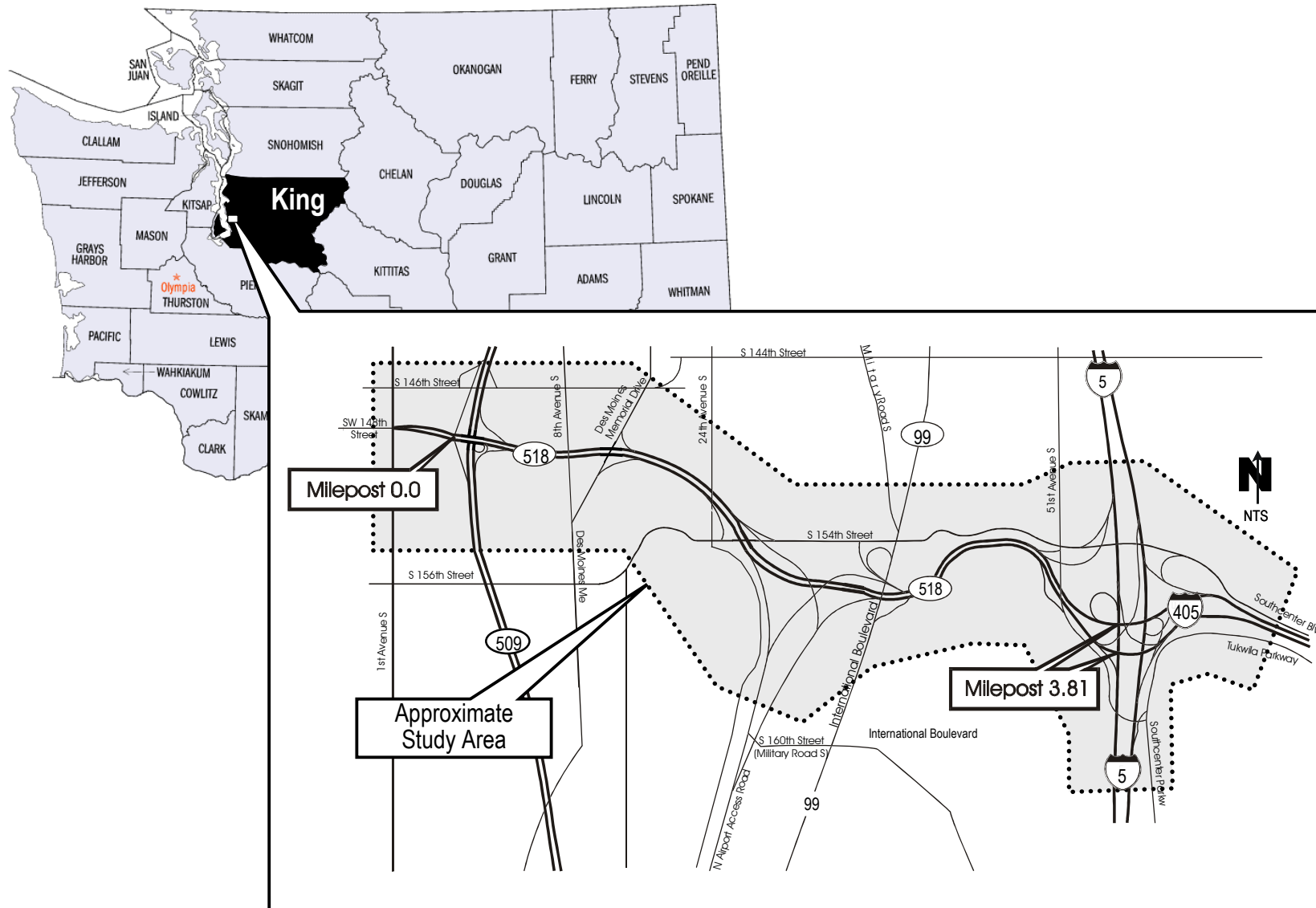
Costs are for order-of-magnitude estimation purposes only.

Costs are for capital costs only and do not include right-of-way purchase, legal fees, WSDOT expenses, financing, inflation to construction time, or operations and maintenance.

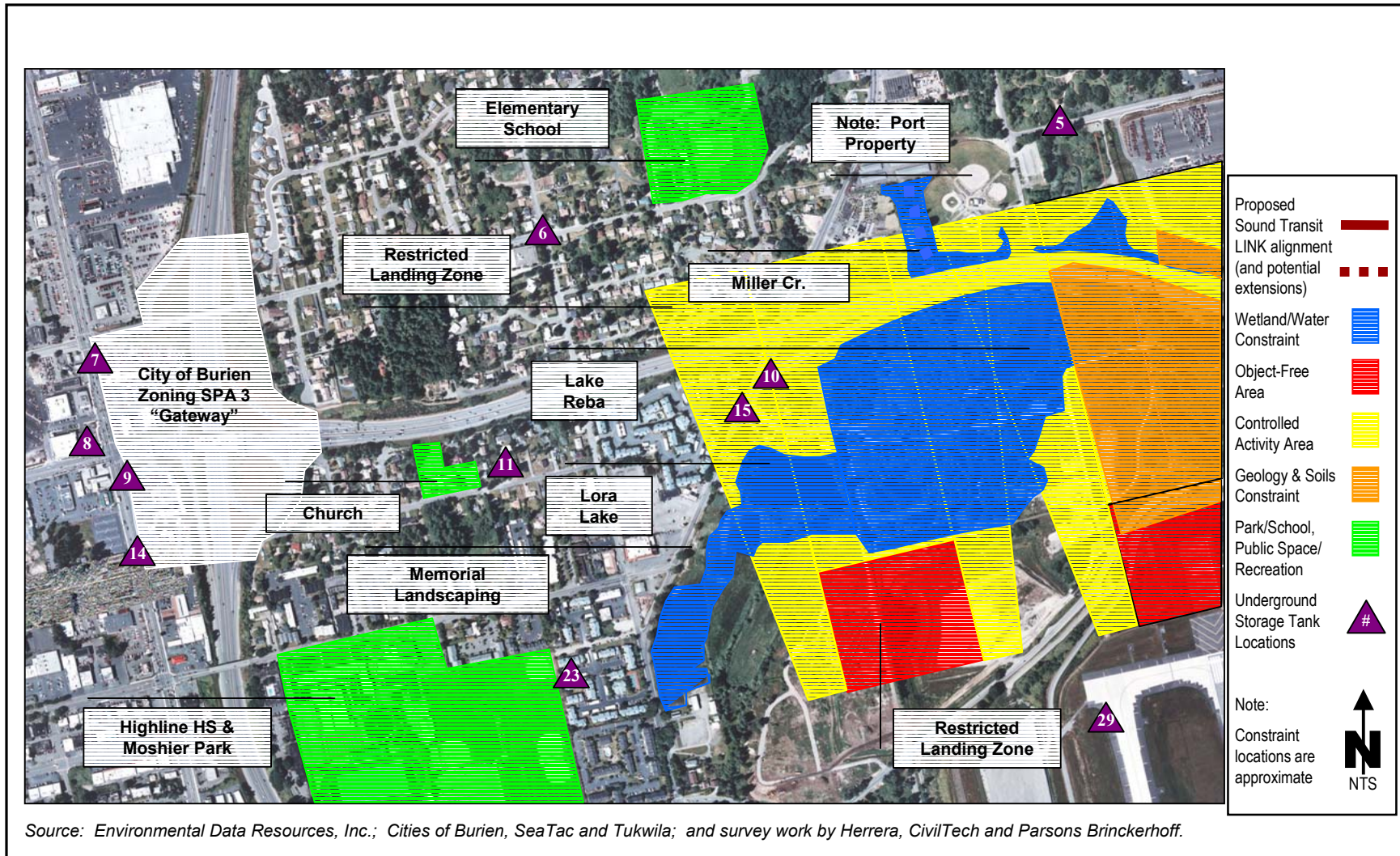
A more detailed cost breakdown is presented in Tables 8.1 through 8.3

Source: Parsons Brinckerhoff

**Figure TS-1  
Study Area Map**

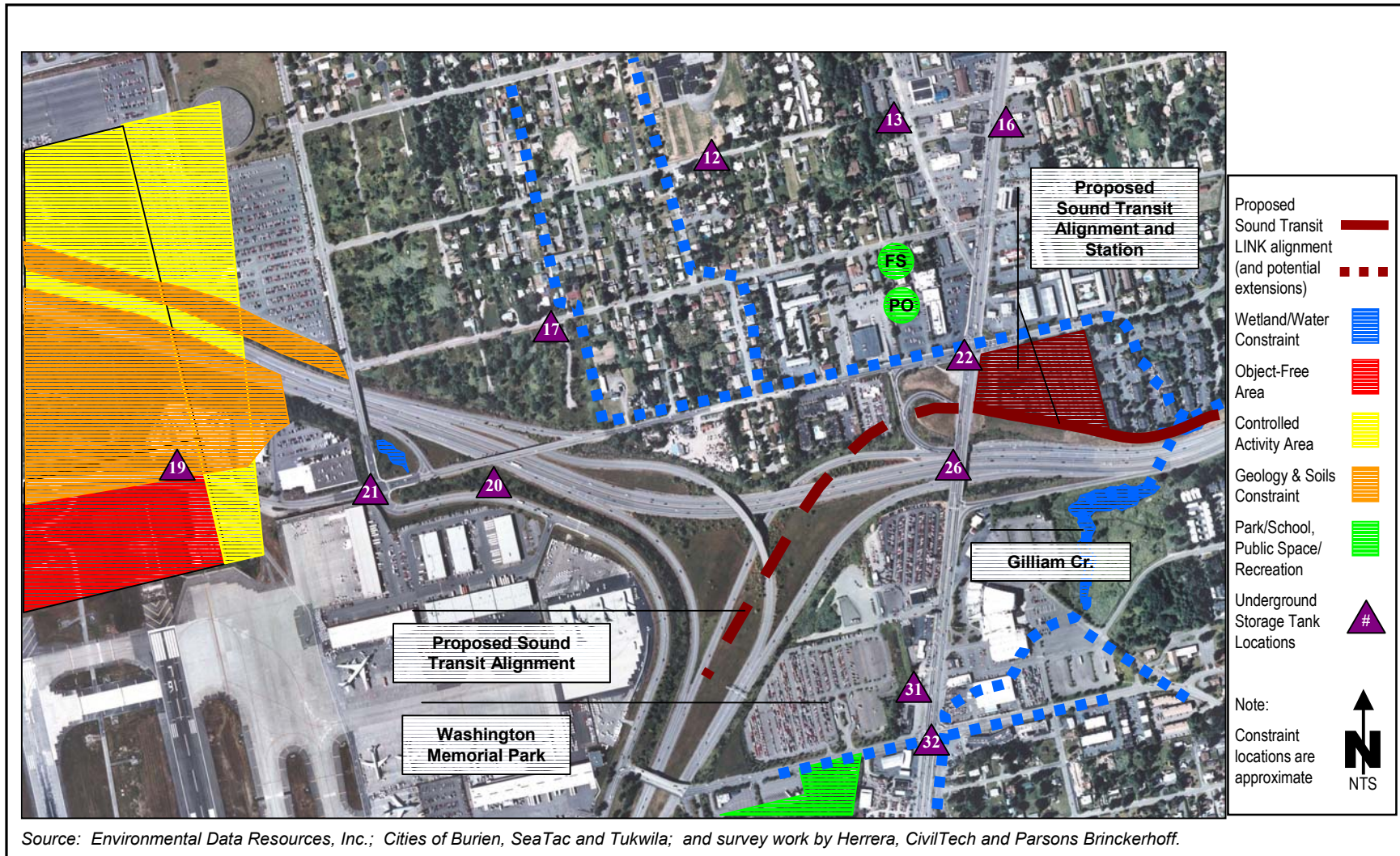


**Figure TS-2a  
Environmental Constraints Map**



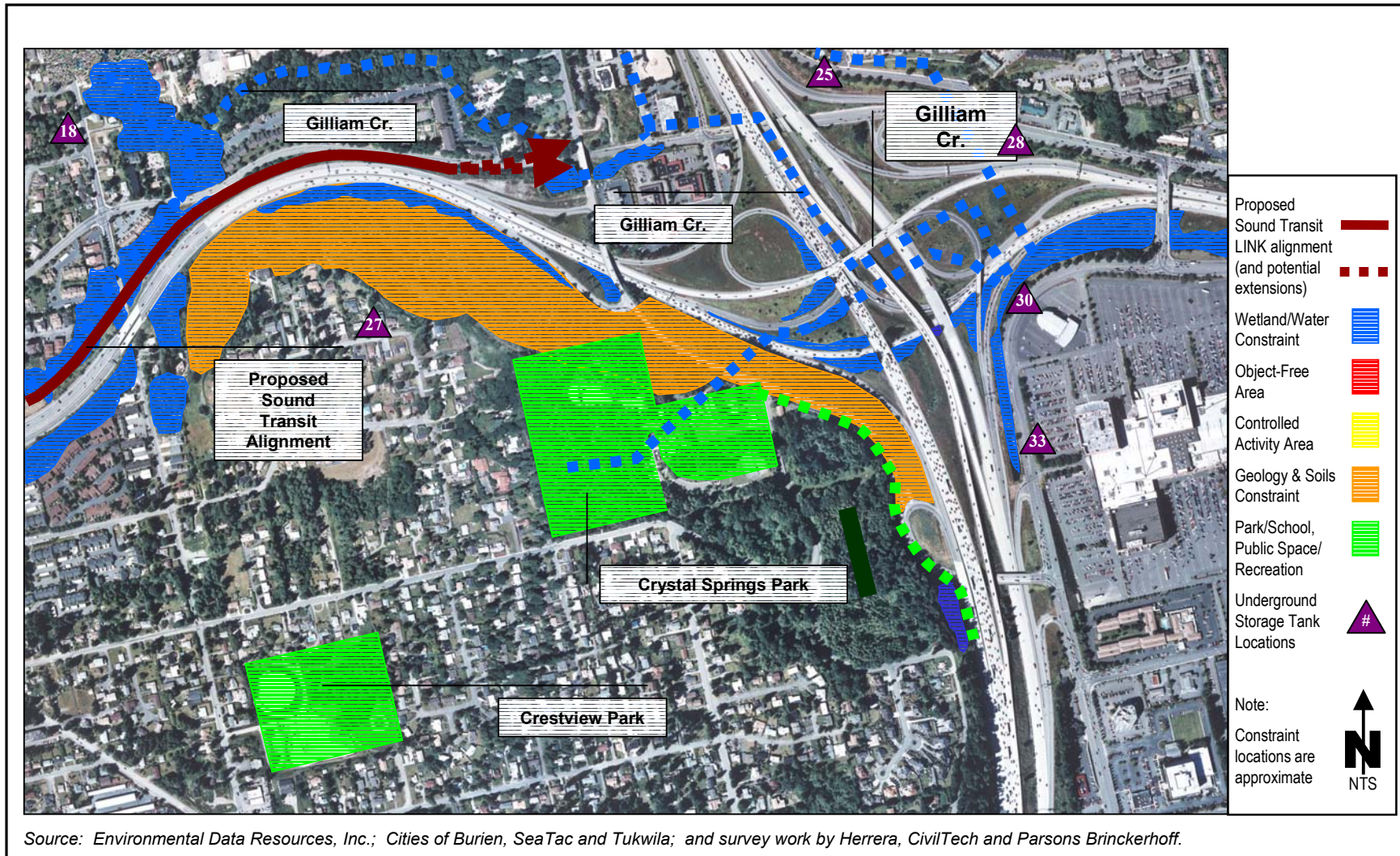


**Figure TS-2b  
Environmental Constraints Map**



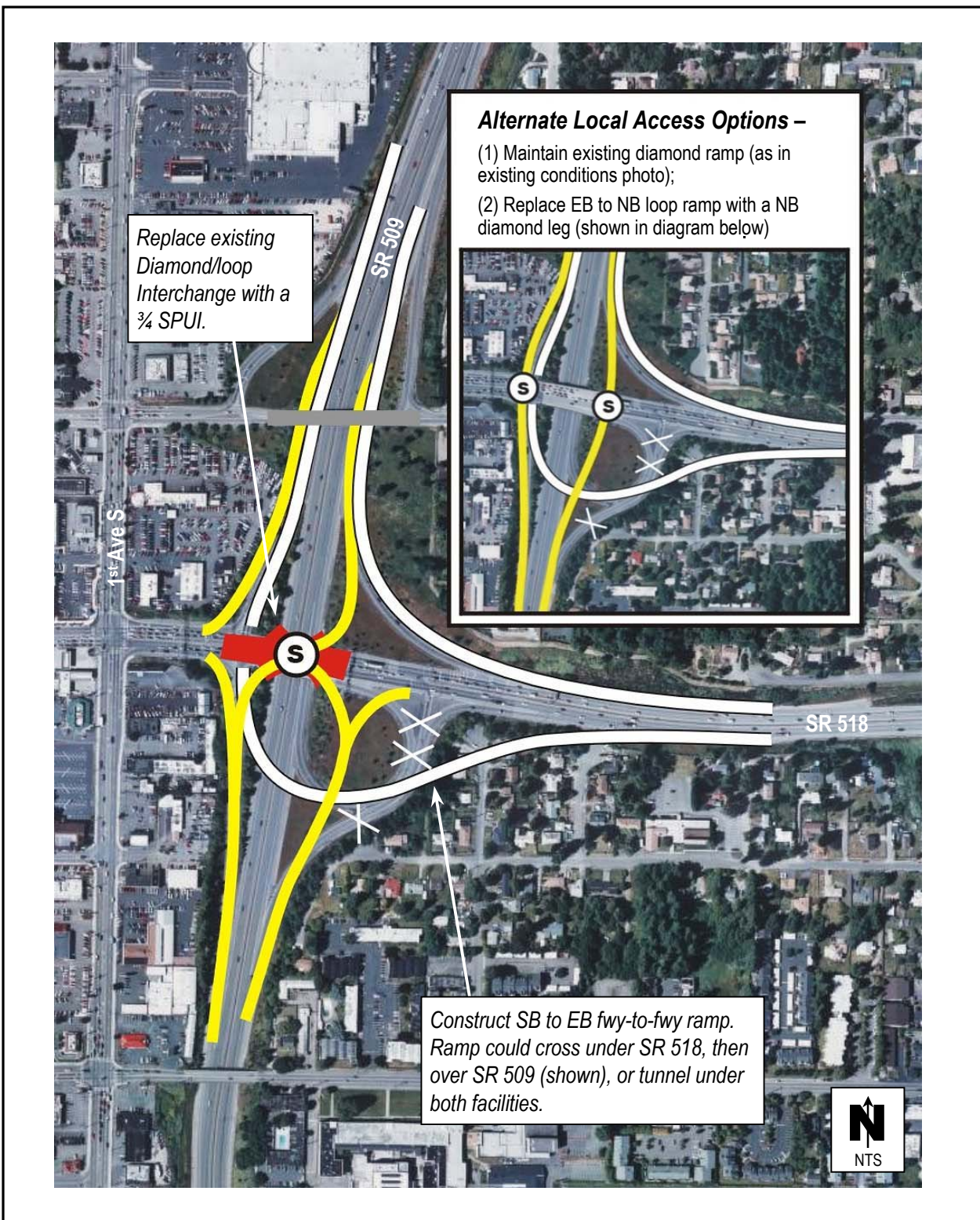


**Figure TS-2c  
Environmental Constraints Map**





**Figure TS-3**  
**Recommended Concept for the SR 509 Interchange**





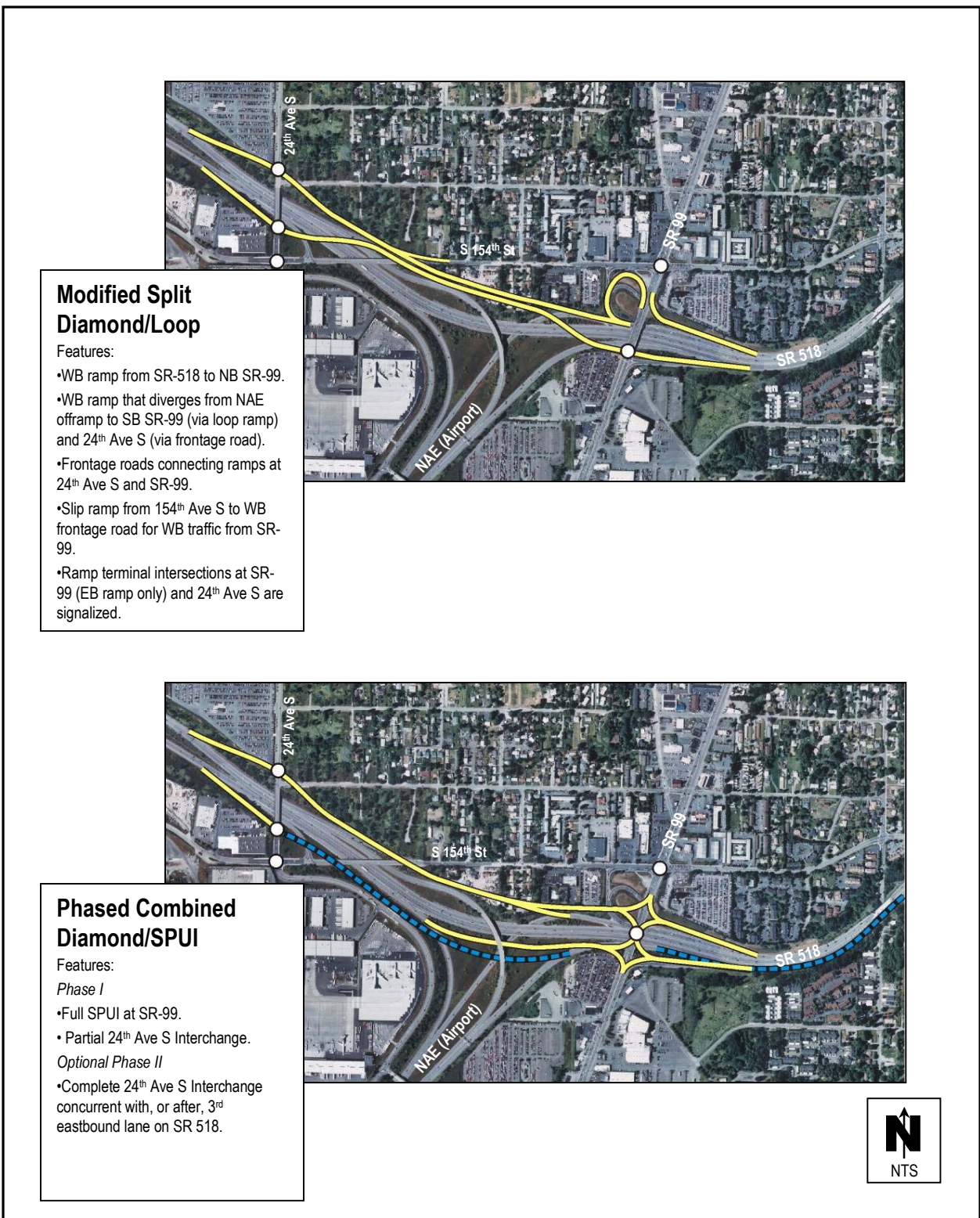
**Figure TS-4**  
**Recommended Concept for the DMMD Interchange**

***No Action Concept Recommended***– No changes at the DMMD Interchange Proposed. Arterial improvements and adjacent interchange improvements recommended instead.



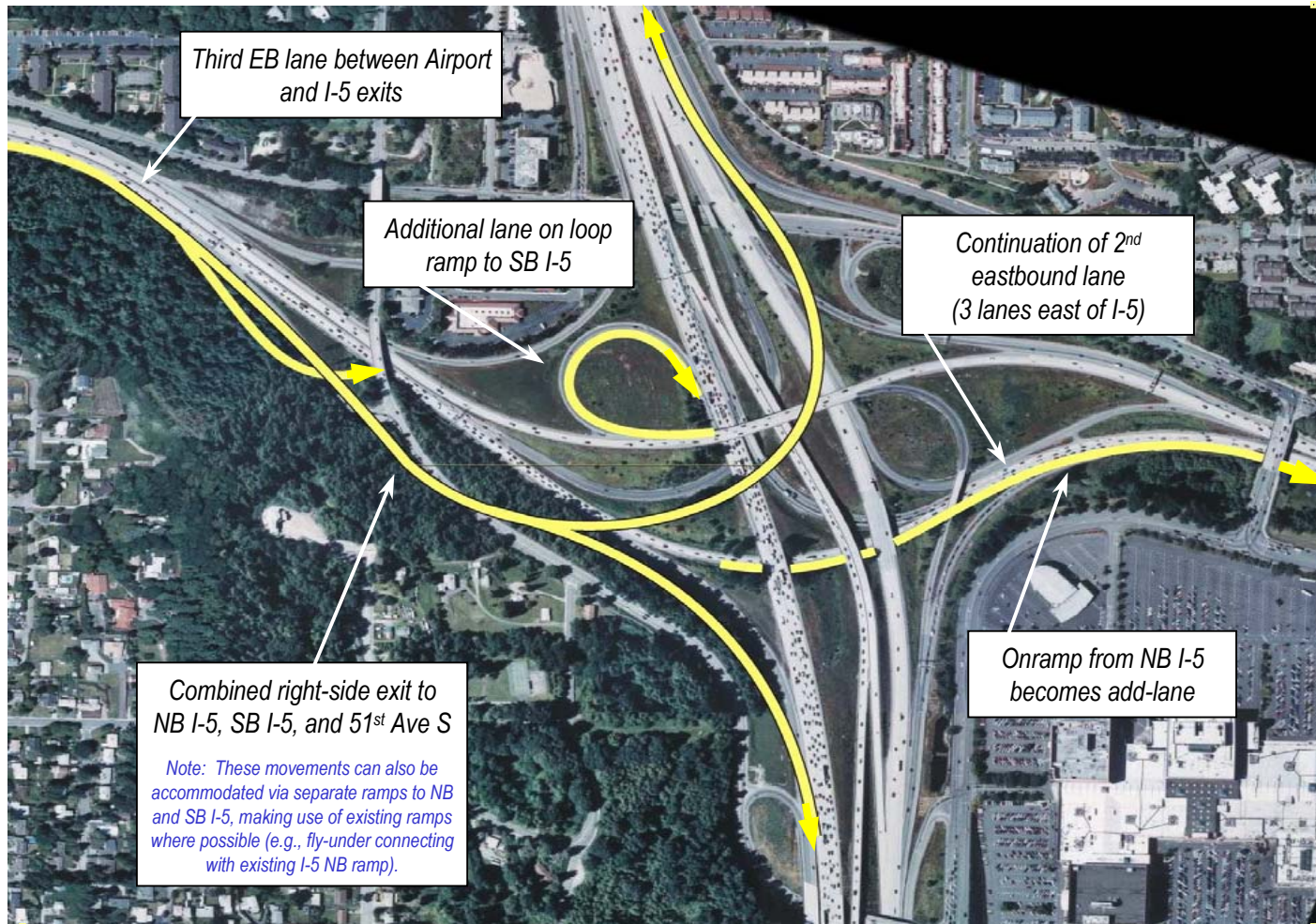


**Figure TS-5**  
**Recommended Concepts for the 24<sup>th</sup> Ave S - SR 99 Interchange**





**Figure TS-6**  
**Recommended Concept for the Tukwila Interchange**



## II. INTRODUCTION

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The SR 518 Route Development Plan (RDP) documents the creation of a long-range plan for the SR 518 corridor located in King County, Washington (see Figure TS-1). An RDP is intended to provide a long-range plan for a specific transportation facility, setting forth a conceptual framework for future improvements. It allows local and regional governments to efficiently plan project implementation and construction over a twenty-year planning horizon.

The SR 518 RDP comprises an understanding of transportation conditions and needs within the corridor. Recommended improvements are identified at locations in the corridor in response to the needs identified. The RDP is the initial step toward eventual implementation of any of the recommended concepts. Subsequent detailed analysis, independent environmental review, and concept refinement would be necessary prior to implementation of any of the concepts recommended.

Previous to this study, the State had identified a need for improvements to the SR 518 corridor to help support projected growth in the cities of Burien, SeaTac, and Tukwila, and at the SeaTac Airport. In particular, the SR 518 interchanges with S 154<sup>th</sup> Street and SR 99 were identified as candidate locations for improvements. In part, the SR 518 RDP will serve as advance planning for subsequent environmental analysis for interchange improvements in this location. The Washington State Department of Transportation (WSDOT) has completed a Draft Environmental Review Summary resulting in the identification of the need for a National Environmental Protection Act (NEPA) Environmental Assessment (EA) for an integrated set of improvements at this location. An agency and public scoping meeting to better define the parameters of the upcoming EA was held in October 2001.

Other corridor interchanges (SR 509, Des Moines Memorial Drive, and Tukwila (I-5 and 51<sup>st</sup> Ave S) interchanges) are also evaluated, so that the RDP is comprehensive in its assessment and evaluation of the corridor. Improvements at each of the interchange locations were found to be independent of each other, and may be pursued on an individual basis.

The SR 518 RDP builds upon work previously completed in the related SR 518/SR 99 Corridor Study, which is documented in two reports:

- *Existing Transportation Conditions, Final Draft, Technical Memorandum 1, SR 518 / SR 99 Corridor Study*, WSDOT, December 1999.
- *2020 Future Baseline Transportation Conditions, Final Draft, Technical Memorandum 2, SR 518 / SR 99 Corridor Study*, WSDOT, November 2000.

The findings presented in both the *Existing Conditions* and *Future Baseline* studies were utilized in the SR 518RDP. In developing the RDP, the following adjustments to the Phase I findings were made:

- Future Baseline forecasts and analyses were updated by five years. For purposes of this study, the design year is assumed to be 2025, 20 years after the expected year of opening in 2005/2006 of any project recommended. Existing year (as previously analyzed) is defined as the year 1998.

- The Forecast (2025) No Action alternative was refined with updated information regarding likely improvements in the area. This updated No Action alternative is referred to as “No Action Plus” and is presented alongside the No Action findings in this report. The No Action Plus is the future baseline scenario to be used as a basis for all other action comparisons.

This report contains the following elements:

- I. **Technical Summary:** A brief overview of the Route Development Plan and its findings.
- II. **Introduction:** Introduces the Route Development Plan.
- III. **Purpose and Need:** A statement of purpose and need, serving as the initial identification of issues feeding into both the RDP and subsequent EA. A list of goals and objectives is also included.
- IV. **Existing Conditions:** A description of the existing facility and study area, including highway and study area location, network classifications and functions, and present operating conditions.
- V. **Future Baseline:** A review of local jurisdictional and state plans and programs affecting the study area, and future baseline operating conditions. Analyses results are presented for both the No Action and No Action Plus scenarios.
- VI. **Interchange Concepts:** Evaluation criteria used for screening of the concepts, a discussion of the concepts developed for each of the interchanges along the corridor, results of the screening process, and a set of final recommendations for each interchange. Also included is a discussion of why an overall corridor TSM approach was not developed as a separate concept.
- VII. **Public Involvement and Consistency with Other Plans:** Identification of stakeholders and a description of their involvement in the development of the RDP, as well as their proposed involvement in the future EA processes.
- VIII. **Funding and Implementation of the RDP:** Discussion of this RDP and its relationship to the State Highway System Plan.

# **III. PURPOSE AND NEED**

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The statement of purpose and need serves as the initial identification of issues feeding into the RDP as well as subsequent environmental processes for each of the identified improvements. The intent is to establish why the State is proposing an action that could potentially cause environmental impacts, both positive and negative. It is to provide the basis for selection of concepts. This statement will be revised and narrowed in focus during the agency and public scoping tasks for the individual environmental processes for identified projects. Goals and objectives of the overall study are also included in this section.

## **3.1 PURPOSE**

The purpose of the SR 518 Route Development Plan is to identify infrastructure improvements necessary to reasonably accommodate forecasted traffic growth, improve traffic operations on the SR 518 corridor, and provide adequate access to the Seattle-Tacoma International Airport and the surrounding communities of Burien, SeaTac, and Tukwila.

## **3.2 NEED**

Improvements to the SR 518 corridor are necessary to correct existing operational inefficiencies and to accommodate future growth in travel demand.

The SR 518 corridor currently experiences high levels of congestion during the peak hours of travel, particularly to the east of SR 99. Congestion is caused both by high levels of travel demand and by roadway geometric design elements that reduce the efficiency of the existing network. Foremost of the existing geometric inefficiencies is the eastbound weave section between SR 99 and northbound I-5 that results in traffic bottlenecking during peak travel demand periods. Another geometric limitation is the lack of fully integrated access at the SR 99 interchange. Trips traveling from SR 99 to SR 518 (a state facility-to-state facility movement) are currently accommodated through the Port of Seattle internal roadway system (a non-state roadway). A third inefficiency is the reduction of the eastbound mainline down to a single lane at the eastern terminus of the route.

Traffic in the study area is forecast to increase significantly due to growth at the Seattle-Tacoma International Airport and in the adjacent communities. A planned extension of SR 509 south to I-5, coupled with the development of a South Airport Expressway, will also affect demand on the SR 518 corridor.

## **3.3 GOALS**

The goals of the SR 518 Route Development Plan are to identify improvements needed to maintain acceptable mobility or level-of-service (LOS) throughout the corridor to a horizon year of 2025; improve access to adjacent jurisdictions and the Seattle-Tacoma International Airport; and correct existing operational and safety deficiencies. Improvements should be developed in a cost effective manner and avoid or minimize impacts to the natural and built environment. The RDP should be implementable in phases.

### 3.4 OBJECTIVES

The SR 518 RDP has seven primary objectives:

1. Incorporate and build on the results of the *Existing Conditions* and *Future Baseline* studies (WSDOT's recently completed SR 518 / SR 99 Corridor Study, Phase I), and the Joint Transportation Study by the City of SeaTac and the Port of Seattle.
2. Identify improvements necessary to improve mobility and accessibility along the SR 518 corridor, and accommodate near-term and long-term (2025) travel demand. The improvements identified should:
  - (a) Avoid or minimize detrimental effects to the natural and built environment by avoiding environmentally sensitive areas.
  - (b) For those impacts that cannot be avoided, provide options that allow those impacts to be adequately mitigated.
  - (c) Improve access to the Airport, to the surrounding communities within the corridor, and to the region by identifying a long-range vision of transportation improvements.
3. Evaluate the potential need for high-occupancy vehicle (HOV) and similar managed facilities connecting with and through the SR 518 corridor.
4. Accommodate aviation clearances as required near the Airport.
5. Identify improvements that are fully developed to state and national standards, and which provide clear and concise driver information/guidance. Generally improve driving safety along the SR 518 corridor, including elements that conform to driver expectation, weaving needs, and adequate decision point distance needs.
6. Develop a long-range vision that is compatible, to the extent possible, with the relevant plans and proposed projects established by neighboring agencies, including:
  - (a) Compatibility with, and accommodation of projected travel demand resulting from, the Port's proposed expansion program at Sea-Tac International Airport.
  - (b) Compatibility with the proposed Sound Transit Link Light Rail along the SR 99 corridor and/or the SR 518 corridor.
  - (c) Compatibility with the City of SeaTac's Phase III improvements on International Boulevard, and incorporate, to the extent possible, the City's freeway access needs.
  - (d) Compatibility with the City of Burien's vision for a "gateway" at the west end of the SR 518 corridor.
  - (e) Compatibility with the City of Tukwila, King County Metro Transit, and other affected agencies, so that future improvements do not preclude the respective development plans and needs of those agencies.
  - (f) Compatibility with other ongoing WSDOT projects, such as the SR 509 Extension EIS, STIA South Access, and the I-405 Programmatic EIS.
7. Maintain an open and meaningful dialogue with the public through the identified Stakeholders, and public outreach program.

## IV. EXISTING CONDITIONS

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Discussed in this section are the existing conditions of the SR 518 corridor and the surrounding study area. A description of the facility is given, along with function and classification under various state and federal systems, and summaries of transit service and non-motorized and other transportation facilities. Following this are present operating conditions including AM and PM peak hour volumes and levels-of-service (LOS) for the freeway and adjacent arterials, as well as a review of accident history and description of planned safety improvements. For the purposes of this report, existing conditions are defined as conditions observed in 1998/99.

### 4.1 HIGHWAY LOCATION, CLASSIFICATION, AND FUNCTION

SR 518 is located in the cities of Burien, SeaTac, and Tukwila in south King County. It is a 3.8-mile urban freeway stretching west from I-5 to SR 509, and serves as the primary access for the Seattle-Tacoma International Airport. A vicinity map is presented in Figure 4.1 identifying the route with begin and end mileposts (MP's) and showing major arterials in the study area.

SR 518 serves residential, commercial, and commute trips for the surrounding communities as well as airport travel. It is classified as a **UF 12** (Urban, Other Freeways and Expressways) by FHWA and is part of the national highway system. It is also identified as a Highway of Statewide Significance (HSS) by WSDOT. Its Freight and Goods Transportation System classification is **T2** (4-10 million tons/year) on the western half of the facility and **T1** (10+ million tons/year) on the eastern half. T1 and T2 classification signifies strategic freight corridors and therefore qualify SR 518 for Freight Mobility Strategic Investment Board funding. The roadside character begins semi-urban, switches to rural, and then back to semi urban. The roadside habitat is largely native/wild vegetation, with evidence of previous landscaping efforts around the Airport. The state functional class is **U1** (Urban, Principal Arterial) throughout. Various types of travel associated with different segments of the corridor, as well as mileposts for the above designation changes, are presented in Table 4.1. Description of the role of the route in the urban network and it's effect on other interdependent network sections, along with current land use and zoning and terrain/roadside character, are also presented in this table.

### 4.2 DESCRIPTION OF EXISTING FACILITY AND STUDY AREA

#### 4.2.1 Facility Description

SR 518 is a 3.8 mile limited access freeway that travels east-west through the cities of Tukwila, SeaTac, and Burien, and also serves as the primary access route to the Seattle-Tacoma International Airport. The facility generally consists of two eastbound and three westbound lanes between I-5 and SR 99; two lanes in each direction between SR 99 and the western North Airport Expressway (NAE) ramps; three lanes in each direction between NAE and Des Moines Memorial Drive (DMMD), and two lanes in each direction between DMMD and SR 509. The facility has two signalized intersections at its western terminus at the SR 509 ramps. Full access control is maintained between the SR 509 ramps (east of the signalized intersections noted) and I-5 (eastern terminus of SR 518).

**Figure 4.1  
Vicinity Map**

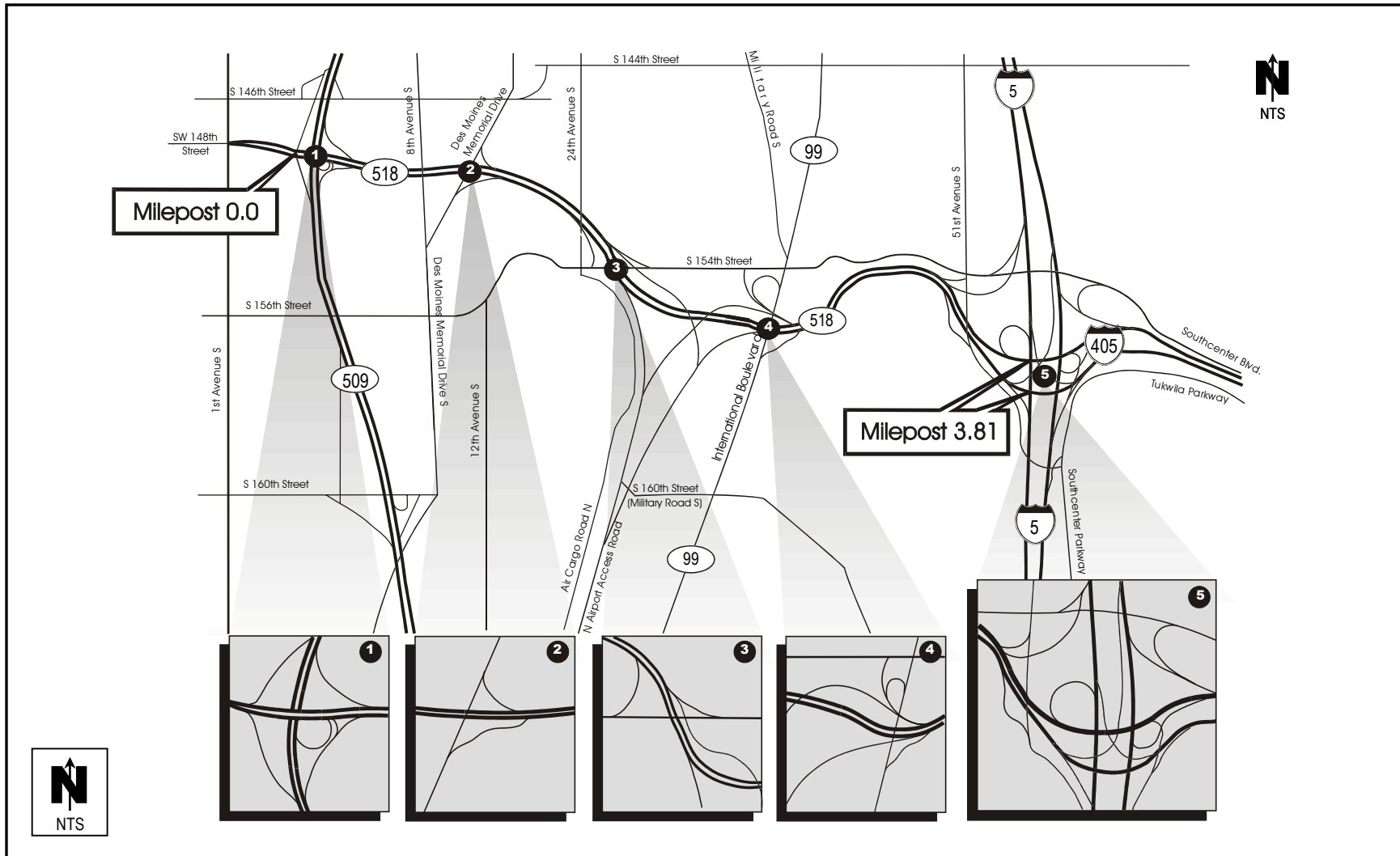




Table 4.1  
SR 518 Existing Facility Description

Begin Segment			End Segment			Lane Description			Roadway Classification					Roadway Function						
									State			Federal								
Ramp	SRMP	ARM	Ramp	SRMP	ARM	No.	Func.	Access Control	FGTS	Roadside Character	Func. Class	FHWA Func.	NHS	Type of Travel	Role in Network	Land Use	Zoning	Notes		
Eastbound Lanes																				
1st Avenue South	n/a	n/a	Off-Ramp to SB SR 509	0.00	0.00	3	GP	Signalized	n/a	n/a	n/a	n/a	n/a	Residential, commercial, and commute traffic; airport trips.	Western terminus of SR 518, connecting Burien to SR 509, SeaTac International Airport, SR 99, I-5, and I-405.	Commercial/ Retail	SPA3	SR 518 begins at the EB off-ramp to SB SR 509.		
Off-Ramp to SB SR 509	0.00	0.00	Loop Off-Ramp to NB SR 509	0.03*	0.03*	3	GP		T2	SU	U1	UF 12	yes			Residential	SPA3, RM24			
Loop Off-Ramp to NB SR 509	0.03*	0.03*	On-Ramp from DMMD	0.83	0.83	2	GP		T2	SU	U1	UF 12	yes			Residential	RM24			
On-Ramp from DMMD	0.83	0.83	Off-Ramp to Airport NAE	1.62	1.62	3	GP	Freeway ramp	T2	SU	U1	UF 12	yes	Residential/commercial Burien and SeaTac traffic; commute trips to Seattle, Everett, Tacoma, and Bellevue	Connection between SR 509 and airport, SR 99, I-5, and I-405; local access to the east from DMMD.	Residential, Airport, Commercial/ Retail	UL7200, AVO			
Off-Ramp to Airport NAE	1.62	1.62	Inside lane merge to right.	3.67	3.28	2	GP		T2/T1	SU/R	U1	UF 12	yes		Connection between airport and SR 99, I-5, and I-405.	Airport, Commercial/ Retail	RC, HDR, LDR	Roadside Character classification changes at SRMP 2.59/ ARM 2.20. FGTS designation changes at SR 99.		
Inside lane merge to right.	3.67	3.28	On-Ramp from SB I-5	0.09	0.09	1	GP		T1	R/SU	U1	UF 12	yes		Eastern terminus of SR 518, connecting SR 518 to I-5 north and south, and I-405 to the east and north.	Commercial/ Retail, Residential	LDR, TUC	SR 518 ends and Roadside Character classification changes at SRMP 3.81/ARM 3.42.		
On-Ramp from SB I-5	0.09	0.09	On-Ramp from Tukwila Parkway	0.54	0.54	3	2-GP, 1-HOV		T1	SU	U1	UF 12	yes		Western terminus of I-405, connecting to I-5 to the north and south, and SR 518 to the west.	Commercial/ Retail	TUC			
Westbound Lanes																				
1st Avenue South	n/a	n/a	On-Ramp from SB SR 509	0.00*	0.00*	4	GP	Signalized	n/a	SU	U1	n/a	n/a	Residential/commercial Burien and SeaTac traffic; commute trips to Seattle, Everett, Tacoma, and Bellevue	Western terminus of SR 518, connecting Burien to SR 509, SeaTac International Airport, SR 99, I-5, and I-405.	Commercial/ Retail	SPA3			
On-Ramp from SB SR 509	0.00*	0.00*	Begin SR 518 MP 0.00	0.00	0.00	3	GP		T2	SU	U1	UF 12	yes			Commercial/ Retail	SPA3, RS7200			
Begin SR 518 MP 0.00	0.00	0.00	Off-Ramp to SB SR 509	0.00	0.00	3	GP		T2	SU	U1	UF 12	yes			Residential	RS7200	SR 518 begins at the EB off-ramp to SB SR 509.		
Off-Ramp to SB SR 509	0.00	0.00	Begin left-turn lane	0.03*	0.03*	4	GP		T2	SU	U1	UF 12	yes			Residential	RS7200			
Begin left-turn lane	0.03*	0.03*	On-Ramp from NB SR 509	0.10	0.10	3	GP		T2	SU	U1	UF 12	yes			Residential	RS7200			
On-Ramp from NB SR 509	0.10	0.10	Off-Ramp to Des Moines Memorial Drive S	0.83	0.83	2	GP	Freeway ramp	T2	SU	U1	UF 12	yes	Residential, commercial, and commute traffic; airport trips.	Connection between SR 509 and airport, SR 99, I-5, and I-405.	Residential	RS7200			
Off-Ramp to Des Moines Memorial Drive S	0.83	0.83	On-Ramp from NAE	1.39	1.39	3	GP		T2	SU	U1	UF 12	yes		Connection between SR 509 and airport, SR 99, I-5, and I-405; local access from the east to DMMD.	Commercial/ Retail, Airport	BP, AVO, AVC, NB			
On-Ramp from NAE	1.39	1.39	Outside lane merge to left	1.49	1.49	2	GP		T2	SU/R	U1	UF 12	yes		Through-traffic from I-405, I-5, and SR 99 past airport toward SR 509 and Burien.	Commercial/ Retail, Airport	BP, AVO	Roadside Character classification changes at SRMP 2.59/ ARM 2.20. FGTS designation changes at SR 99.		
Outside lane merge to left	1.49	1.49	Off-Ramp to NAE	2.75	2.36	3	GP		T2	R	U1	UF 12	yes		Connection between airport and SR 99, I-5, and I-405.	Airport, Commercial	AVO, AVC			
Off-Ramp to NAE	2.75	2.36	Begin exit-only auxiliary lane	2.91*	2.52*	4	GP		T2	R	U1	UF 12	yes			Airport, Commercial	AVC, NB			
Begin exit-only auxiliary lane	2.91*	2.52*	On-Ramp from SB I-5	3.40	3.01	3	GP		T2	R	U1	UF 12	yes			Commercial/ Retail, Residential	NB, UL7200, UH900, CB			
On-Ramp from SB I-5	3.40	3.01	HOV off-ramp to NB I-5	0.32	0.32	2	GP		Freeway ramp	T2/T1	R/SU	U1	UF 12		yes	Residential, commercial, and commute traffic; airport trips.	Eastern terminus of SR 518, connecting SR 518 to I-5 north and south, and I-405 to the east and north.	Commercial/ Retail	RCM	SR 518 ends and Roadside Character classification changes at SRMP 3.81/ARM 3.42.
HOV off-ramp to NB I-5	0.32	0.32	Off-Ramp to NB I-5	0.45	0.45	3	GP			T1	SU	U1	UF 12		yes		Western terminus of I-405, connecting to I-5 to the north and south, and SR 518 to the west.	Commercial/ Retail	RCM	
Off-Ramp to NB I-5	0.45	0.45	On-Ramp from SB SR 181	0.60	0.60	4	3-GP, 1-HOV			T1	SU	U1	UF 12		yes		Commercial/ Retail, Office, Residential	RCM, O, LDR, C/LI		

\* Not identified in the State Highway Log. Estimated from mapping.  
Sources: WSDOT 1998 [State Highway Log](#); WSDOT [Roadside Classification Plan](#), 1996; WSDOT [Design Manual](#), August 1998; WSDOT [2001 - 2020 Highway System Plan](#); other information as provided by WSDOT; Comprehensive Plan and Zoning maps from the cities of Burien, SeaTac, and Tukwila.

ABBREVIATIONS

**ARM** -Accumulated Route Mileage represents the actual mileage along a roadway section.  
**DMMD** -Des Moines Memorial Drive  
**FGTS** -Freight and Goods Transportation System classification  
**FHWA** -Federal Highway Administration  
**NAE** -North Airport Expressway  
**NHS** -National Highway System  
**R** -Rural  
**SRMP** -State Route Milepost. This identifies on-site reference points and should not be used for computing distance.  
**SU** -Semi-Urban  
**T1** -10+ million tons/year  
**T2** -4 to 10 million tons/year  
**U1** -Urban, Principal Arterial  
**UF 12** -Urban, Other Freeways and Expressways

ZONING DESIGNATIONS

**City of Burien**  
SPA3 = Special Planning Area 3  
RS7200 = Residential, Single Family  
RM24 = Residential, Multifamily

**City of SeaTac**  
UL7200 = Urban Low Density Residential  
AVO = Aviation Operations  
AVC = Aviation Commercial  
NB = Neighborhood Business  
UH900 = Urban High Density Residential  
CB = Community Business

**City of Tukwila**  
LDR = Low Density Residential  
HDR = High Density Residential  
RCM = Regional Commercial Mixed Use  
TUC = Tukwila Urban Center  
O = Office  
C/LI = Commercial Light Industrial

## Table 4.2

### SR 518 Existing Lane Details

Begin Segment		End Segment		Width in Feet					Elevation	Sub-Standard Elements	
SRMP	ARM	SRMP	ARM	No. of Lanes	Left Shoulder	Roadway	Right Shoulder	Special Use Lane	Beginning (feet)		
Eastbound Roadway											
0.00	0.00	0.05	0.05	2	0	94	0	n/a	347	Stopping sight distance - 55 mph crest vertical curve	
0.05	0.05	0.39	0.39	2	0	24	10	n/a	351		
0.39	0.39	0.42	0.42	2	0	34	0	n/a	337		
0.42	0.42	0.60	0.60	2	0	24	10	n/a	335		
0.60	0.60	0.64	0.64	2	0	34	0	n/a	318		
0.64	0.64	0.83	0.83	2	0	24	10	n/a	312	Stopping sight distance - 50 mph crest vertical curve	
0.83	0.83	0.91	0.91	3	0	36	10	12	284		
0.91	0.91	1.03	1.03	3	6	36	10	12	282		
1.03	1.03	1.32	1.32	3	8	36	10	12	297		
1.32	1.32	1.36	1.36	3	8	36	10	24	345		
1.36	1.36	1.39	1.39	3	0	36	10	24	352		
1.39	1.39	1.43	1.43	3	0	36	10	n/a	357		
1.43	1.43	1.62	1.62	3	0	36	10	n/a	363		
1.62	1.62	2.29	1.90	2	0	24	10	n/a	395		
2.29	1.90	2.32	1.93	2	0	34	0	n/a	379		
2.32	1.93	2.91	2.52	2	0	24	10	n/a	373	Right shoulder < 10' at SR 99 Pier	
2.91	2.52	2.95	2.56	2	0	30	0	n/a	255	Right shoulder < 10'; left shoulder < 4'	
2.95	2.56	3.28	2.89	2	0	24	10	n/a	247	Stopping sight distance - 57 mph crest vertical curve	
3.28	2.89	3.55	3.16	2	0	24	10	n/a	166		
3.55	3.16	3.67	3.28	2	4	24	10	n/a	99		
3.67	3.28	3.79	3.40	1	4	12	10	n/a	69		
3.79	3.40	3.81	3.42	1	6	12	10	n/a	46		
Westbound Roadway											
0.05	0.05	0.39	0.39	2	10	24	0	n/a	352		Stopping sight distance - 55 mph crest vertical curve
0.39	0.39	0.64	0.64	2	0	34	0	n/a	337		
0.64	0.64	0.91	0.91	2	10	24	0	n/a	312		
0.91	0.91	1.03	1.03	2	10	24	6	n/a	283	Stopping sight distance - 50 mph crest vertical curve	
1.03	1.03	1.36	1.36	2	10	24	8	n/a	298		
1.36	1.36	1.62	1.62	2	10	24	0	n/a	353		
1.62	1.62	2.05	1.66	2	24	36	0	n/a	396		
2.05	1.66	2.29	1.90	3	10	36	0	n/a	401		
2.29	1.90	2.32	1.93	3	0	46	0	n/a	380	Right shoulder < 10'; left shoulder < 4'	
2.32	1.93	2.91	2.52	3	10	36	0	n/a	374		
2.91	2.52	2.95	2.56	3	0	42	0	n/a	257		
2.95	2.56	3.28	2.89	3	4	36	0	n/a	249		
3.28	2.89	3.50	3.11	2	4	24	0	n/a	167		
3.50	3.11	3.55	3.16	2	10	24	0	n/a	111		
3.55	3.16	3.79	3.40	2	10	24	10	n/a	99		
3.79	3.40	3.81	3.42	2	0	42	0	n/a	56		

ARM - Accumulated Route Mileage represents the actual mileage along a roadway section.

DMMD - Des Moines Memorial Drive S

SRMP - State Route Milepost. This identifies on-site reference points and should not be used for computing distance.

Source: WSDOT 1998 State Highway Log.

SR 518 has auxiliary lanes in several segments throughout the alignment in both directions. The eastbound terminus of the facility narrows to a single lane. Existing lane and shoulder configuration, lane width, and lane function are presented along with milepost designations in Table 4.2. Sub-standard geometric elements are also identified in this table. Horizontal and vertical alignments are presented in Figure 4.2. Typical mainline sections for the two- and three-lane facility are presented in Figure 4.3.

As of December 1998, no part of the facility has been identified as an historic preservation site.<sup>1</sup>

The facility also has numerous over- and under-passes. A comprehensive list of all bridges and structures including bridge number, milepost location, length, and width is presented in Table 4.3.

**Table 4.3**  
**SR 518 Existing Bridge and Undercrossing Inventory**

Bridge Number	Identifier	Type	Begin		End		Length	Width	HSP Status
			SRMP	ARM	SRMP	ARM			
518/008	SR 509	O	0.00	0.00	0.05	0.05	0.05	94.00	No
518/009	8th Avenue S	O	0.39	0.39	0.42	0.42	0.03	68.00	No
518/010	Des Moines Memorial Drive S	O	0.60	0.60	0.64	0.64	0.04	68.00	No
518/012	24th Avenue S	U	1.46	1.46	-	-	-	60.00	No
518/013	S 154th Street	U	1.62	1.62	-	-	-	60.00	No
518/014 N-W	N to W On-Ramp from NAE	U	2.26	1.87	-	-	-	60.00	No
518/014	W to S Off-Ramp to NAE	O	2.29	1.90	2.32	1.93	0.03	80.00	No
099/500	SR 99	U	2.49	2.10	-	-	-	60.00	No
518/018	42nd Avenue S	O	2.91	2.52	2.95	2.56	0.04	72.00	No
518/022	51st Avenue S	U	2.51	3.12	-	-	-	48.00	No
005/521	SR 5 SB	U	3.81	3.42	-	-	-	54.00	No

ARM - Accumulated Route Mileage represents the actual mileage along a roadway section.

HSP - Historic Preservation program.

O - Overcrossing (Bridge on SR-518)

SRMP - State Route Milepost. This identifies on-site reference points and should not be used for computing distance.

U - Undercrossing (Bridge on other facility crosses SR-518 at specified location)

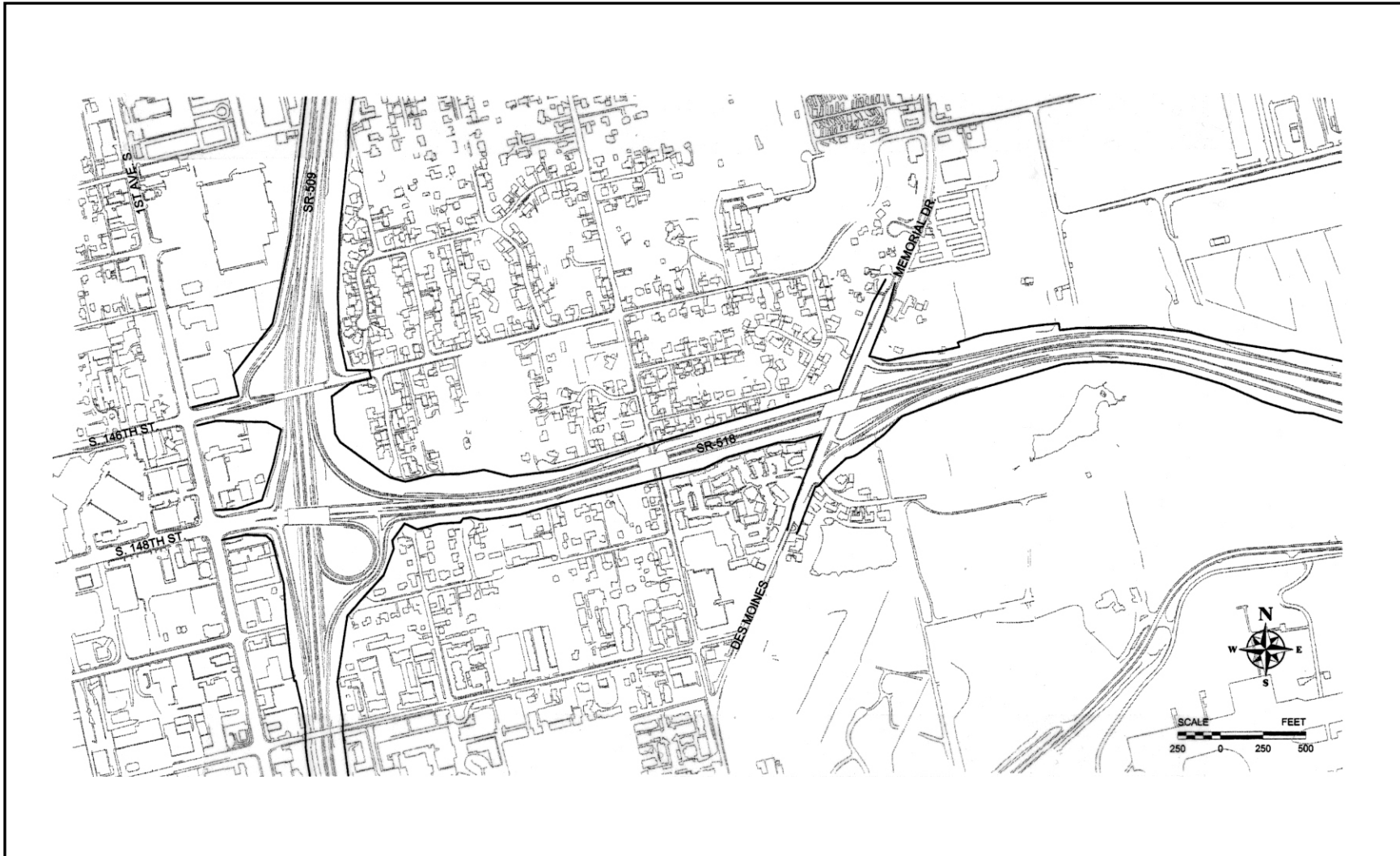
Source: WSDOT 1998 *State Highway Log*; other information as provided by WSDOT.

## 4.2.2 Local Network Description

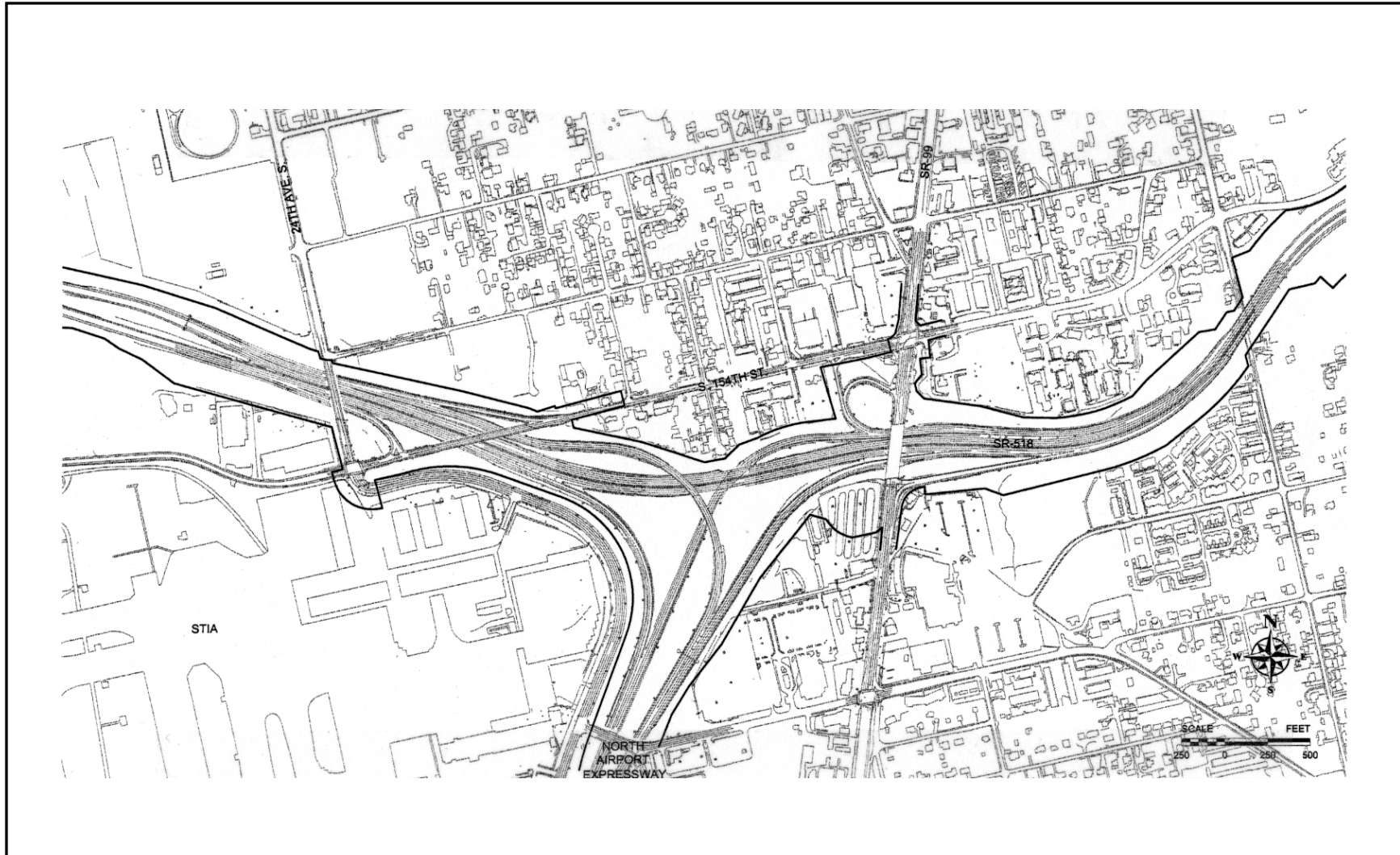
Access control details for the facility were presented in Table 4.1. An aerial photograph of ramp termini intersections with a description of channelization and traffic control is presented in Appendix B, Figures B.1 through B.13. Existing right-of-way limits around the facility corridor are presented in Figure 4.2, and are presented for the corridor as a whole in Figure 4.4.

<sup>1</sup> Transportation Commission List of Highways of Statewide Significance, by Resolution #584, December 17, 1998.

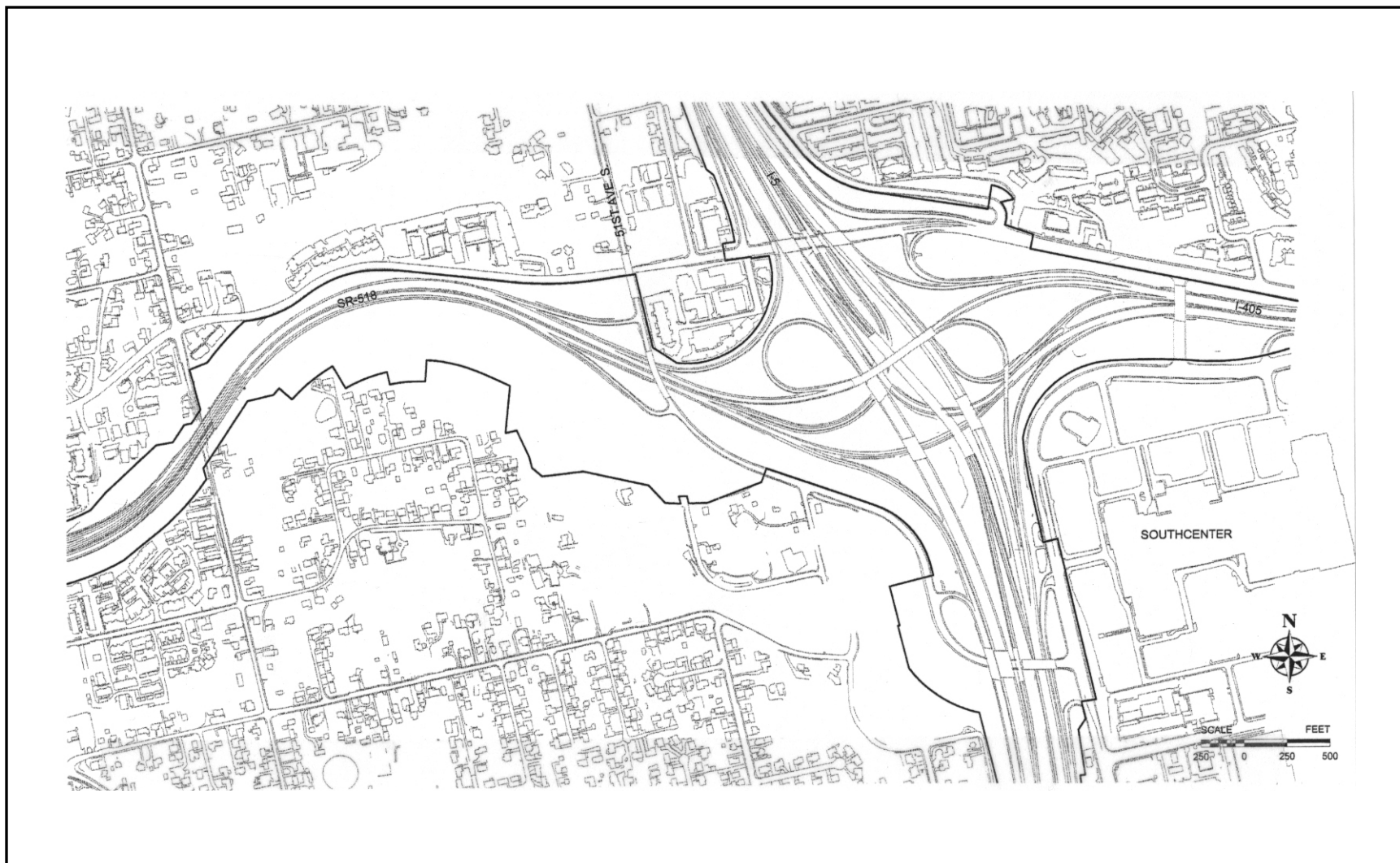
**Figure 4.2a**  
**SR 518 Existing Alignment**



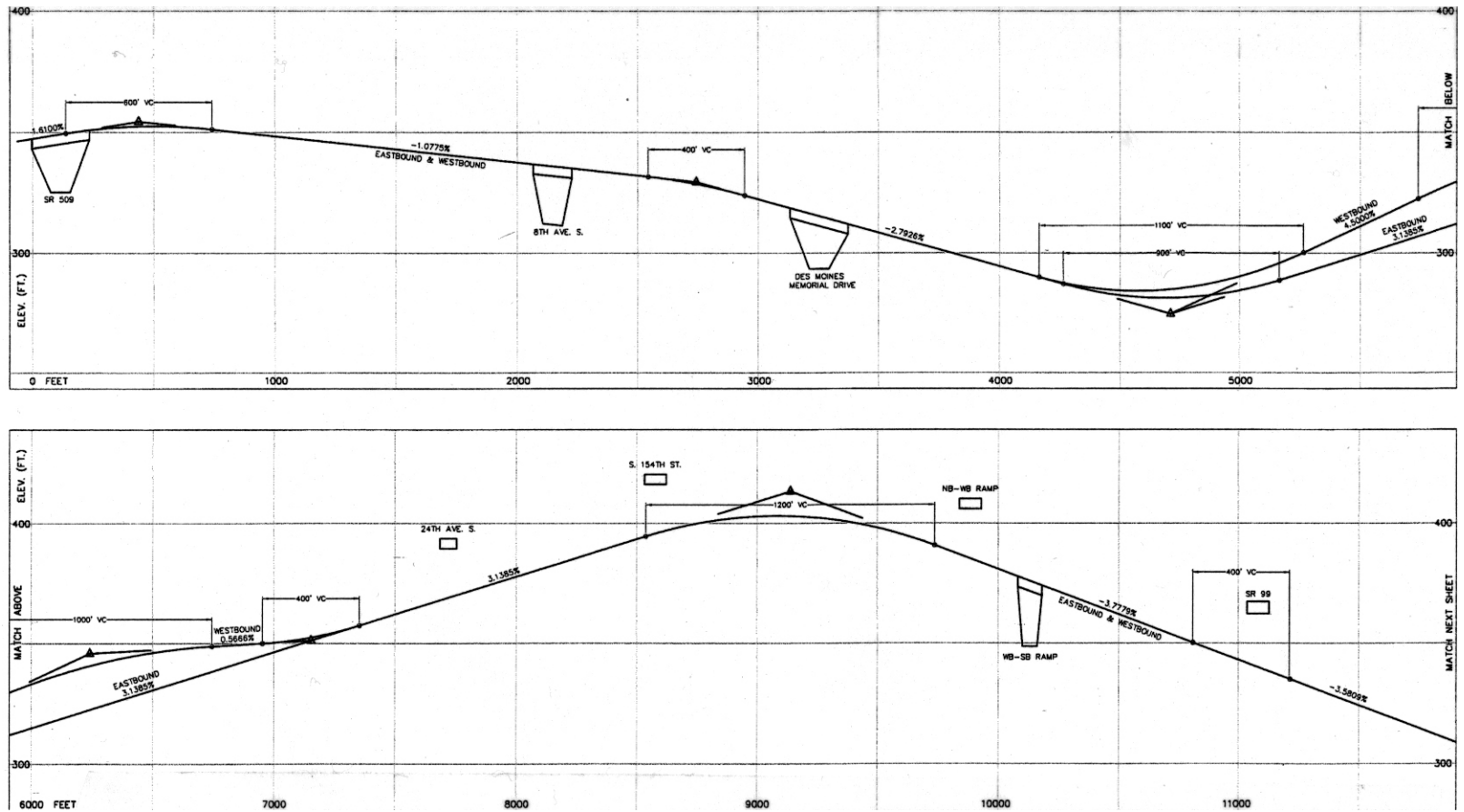
**Figure 4.2b**  
**SR 518 Existing Alignment**



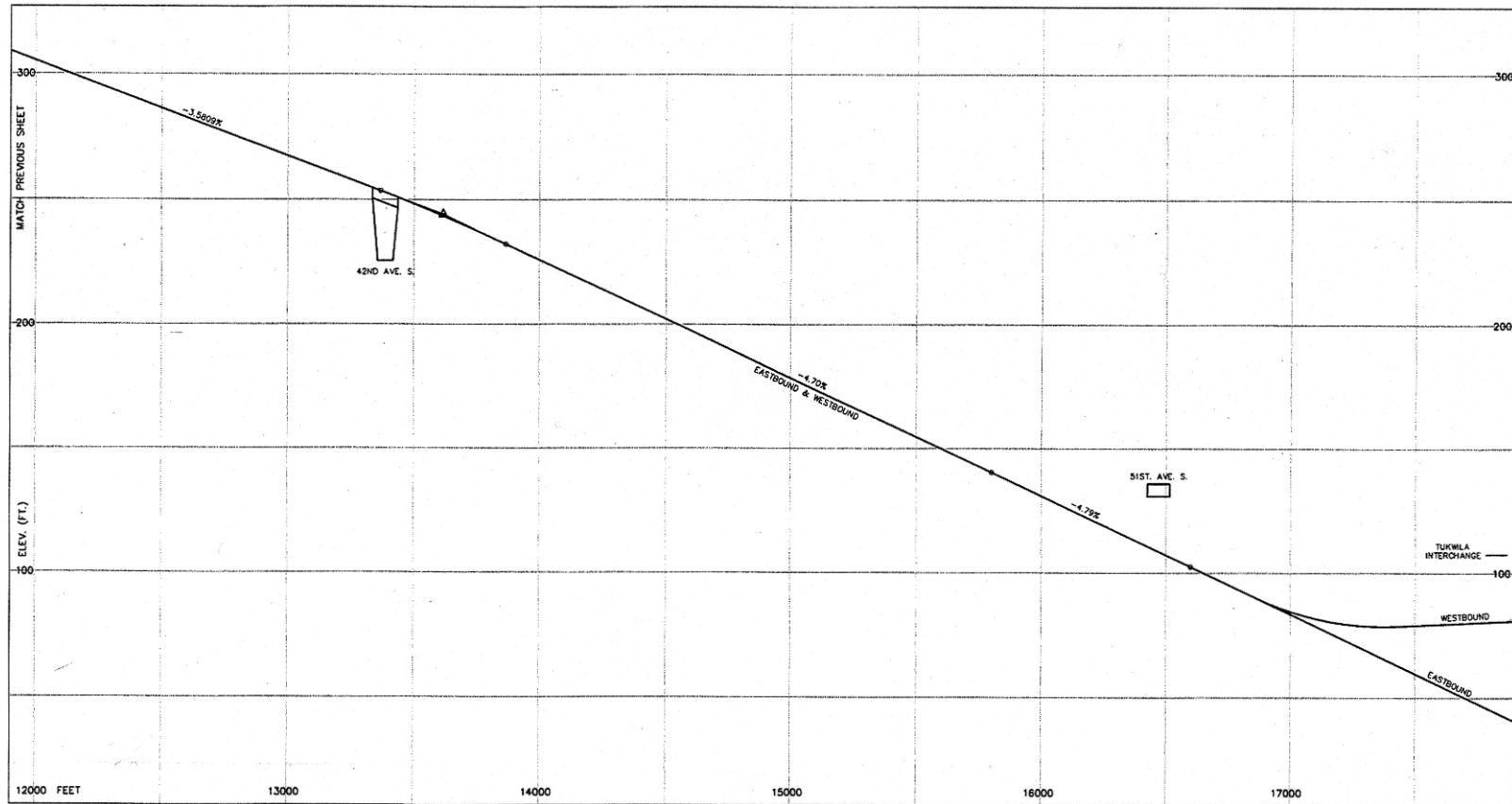
**Figure 4.2c**  
**SR 518 Existing Alignment**



**Figure 4.2d**  
**SR 518 Existing Alignment**

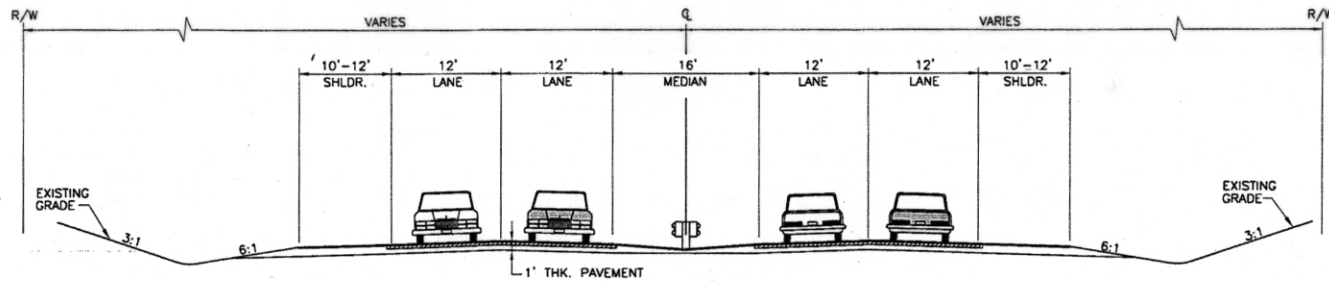


**Figure 4.2e**  
**SR 518 Existing Alignment**

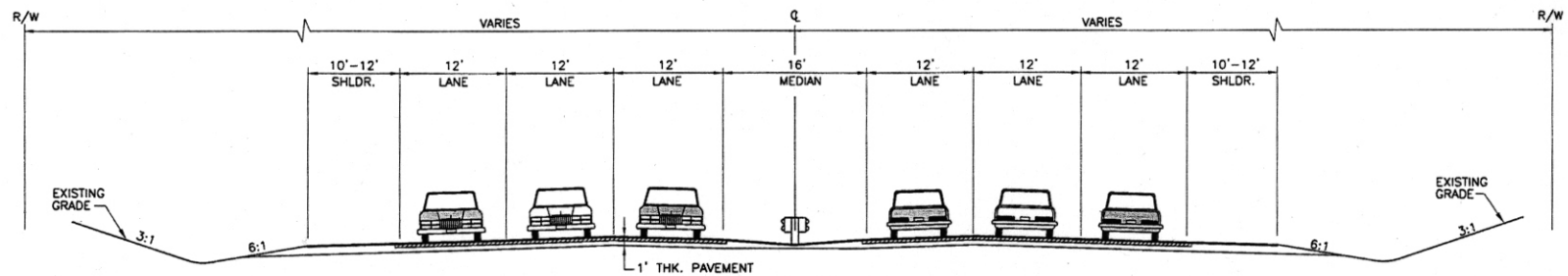




**Figure 4.3**  
**SR 518 Typical Sections**

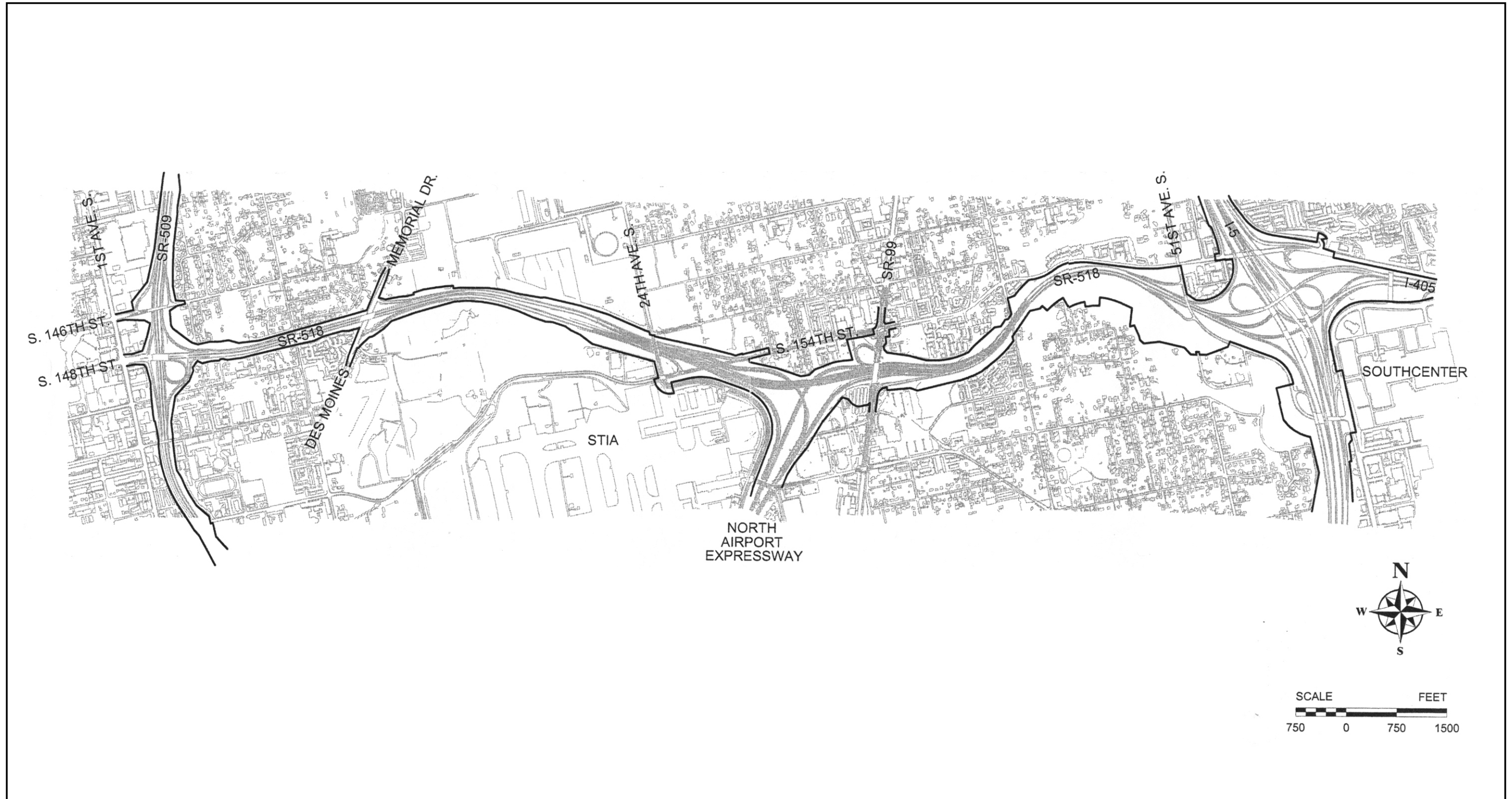


TYPICAL FOUR-LANE SECTION  
SR-518



TYPICAL SIX-LANE SECTION  
SR-518

**Figure 4.4**  
**SR 518 Existing Right-of-Way Limits**



Other facilities classified as freeways in the study area include I-5 and SR 509. Principal arterials include SR 99/International Boulevard, 1<sup>st</sup> Avenue S, SW 148<sup>th</sup> Street, and Southcenter Boulevard. Minor arterials, collector/neighborhood arterials, and other major components of the local street system are presented in Figure 4.5. Street details including number of lanes, width, sidewalk improvements, and type of traffic control are presented for the principal arterials in Table 4.4.

**Table 4.4**  
**Principal Arterial Network**

Name	No. of Lanes	Approx. Width	Sidewalk	Traffic Control
SW 148th Street	4, plus median and auxiliary turn lanes	12.0' - 12.5'	Intermittent	Main streets are signalized, cross-streets have stops.
1st Avenue S	4, plus median and auxiliary turn lanes	10.5' - 11.0'	Intermittent	Main streets are signalized, cross-streets have stops.
SR 99/International Boulevard	4, plus median and auxiliary turn lanes	11.5' - 12.0'	Intermittent	Main streets are signalized, cross-streets have stops.
Southcenter Boulevard	2-4, plus median and auxiliary turn lanes	12.0'	Intermittent	Main streets are signalized, cross-streets have stops.

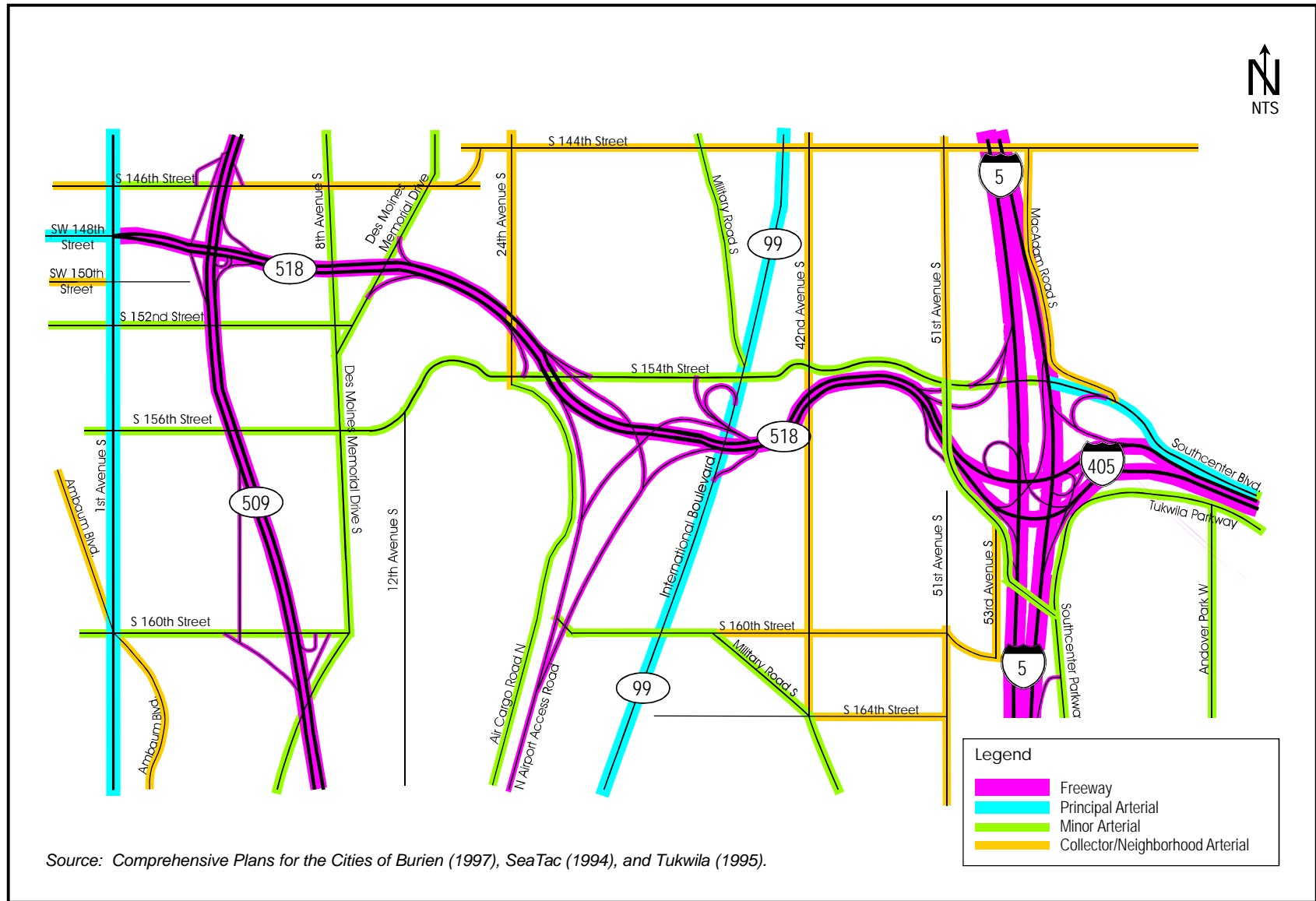
Source: Parsons Brinckerhoff

### 4.2.3 Transit and Other Transportation Facilities

The study area is currently served by eight King County Metro and three Sound Transit routes. Many of these routes provide localized service and do not utilize the SR 518 facility. King County Metro 130, 132, and 137 run north-south, connecting Burien to Seattle and south to Normandy Park, Des Moines, and Midway via SR 509. Metro 170 connects Seattle to SeaTac via local streets. Metro 174 runs north-south, connecting Burien to Seattle and Federal Way via SR 99. Metro 191 also provides a north-south link between Seattle and Star Lake, utilizing I-5 and SR 518 to access SR 99 south. Metro 140 runs east-west, connecting Burien to SeaTac, Southcenter Mall, and Renton, utilizing both local streets and I-405, SR 518, and SR 99. Metro 194 runs between Seattle and Federal Way, utilizing I-5 and SR 518, and stopping at the Airport before continuing south on SR 99. Sound Transit 574 connects Tacoma with the Airport via SR 99 and I-5. Sound Transit routes 560 and 570 connect Seattle to the Airport, 560 via I-405/SR 518, and 170 via local streets and the western half of SR 518. This is the only transit route utilizing the western half of the facility. Routes utilizing the eastern half of the facility include Routes 140, 191, 194, and 560. Existing transit routes are presented in Figure 4.6.

Related transportation facilities in the area include two permanent park-and-ride lots, four leased park-and-ride lots, and the Airport and airport-related transportation facilities including both on- and off-site parking lots. Non-motorized facilities in the nearby area include short walking trails at several local parks, an existing bicycle path along a section of Des Moines Memorial Drive, and proposed paths and sidewalk improvements along a number of major and minor arterials and local collector streets. These facilities are presented in Figure 4.7.

Figure 4.5  
Street System Classification



## Existing Public Transit Routes in the Study Area

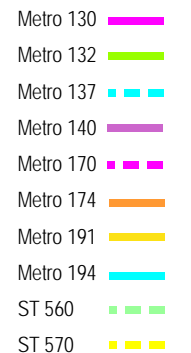
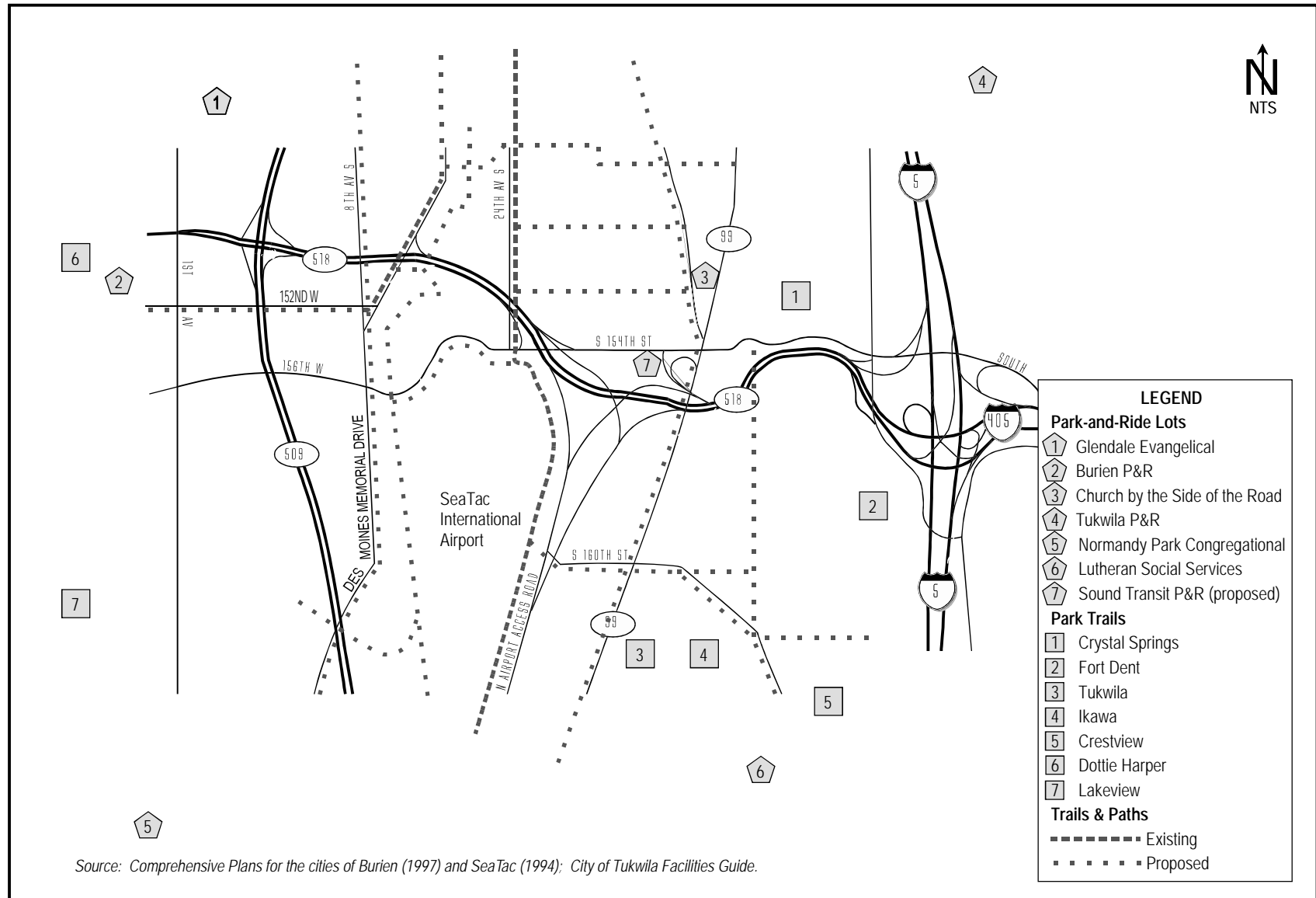


Figure 4.7  
Other Study Area Transportation Facilities



#### **4.2.4 Environmental Constraints**

A preliminary survey of existing environmental issues and constraints was performed for the SR 518 corridor and immediately adjacent areas. Constraints identified include Federal Aviation Administration controlled activity and object-free areas, wetlands, geology/soils, recreational areas, and potential hazardous material sites. These are presented in Figure 4.8. The level of environmental reconnaissance conducted is sufficient for initial concept evaluation; a formal Environmental Assessment would need to be performed for each interchange area as improvements are funded and scheduled for implementation.

### **4.3 ZONE OF INFLUENCE BOUNDARIES**

The zone of influence for each SR 518 interchange area could be described on one level as “regional,” in that they serve a primary, regional transportation corridor. This is particularly true for the SR 509, SR 99/Airport, and I-5/Tukwila interchanges, which provide access between SR 518 and other regional facilities. The Des Moines Memorial Drive interchange is more locally oriented, providing access to neighborhoods in Burien and SeaTac.

In addition to serving a regional transportation role, the facilities on SR 518 also affect a localized area. The geographical boundaries of the immediate zones of influence for each interchange are presented below.

#### **SR 509 INTERCHANGE**

The SR 509 interchange area is roughly bounded on the west by 1st Avenue S a north-south principal arterial; on the north by S 146<sup>th</sup> Street, a collector/neighborhood arterial; on the east by Des Moines Memorial Drive and 8<sup>th</sup> Avenue S, both minor arterials; and on the south by S 156<sup>th</sup> Street, a minor arterial. Improvements to this interchange are likely to affect (directly or indirectly) the Burien neighborhoods of Shorewood, Seahurst, Gregory Heights, Sunnysdale and Three Tree Point, as well as the Normandy Park area. Improvements would also impact the two closely adjacent SR 509 interchanges at S 146<sup>th</sup> and 160<sup>th</sup> Streets, as well as all regional traffic utilizing SR 509 for Airport access and the Des Moines Memorial Drive interchange on SR 518.

#### **DMMD INTERCHANGE**

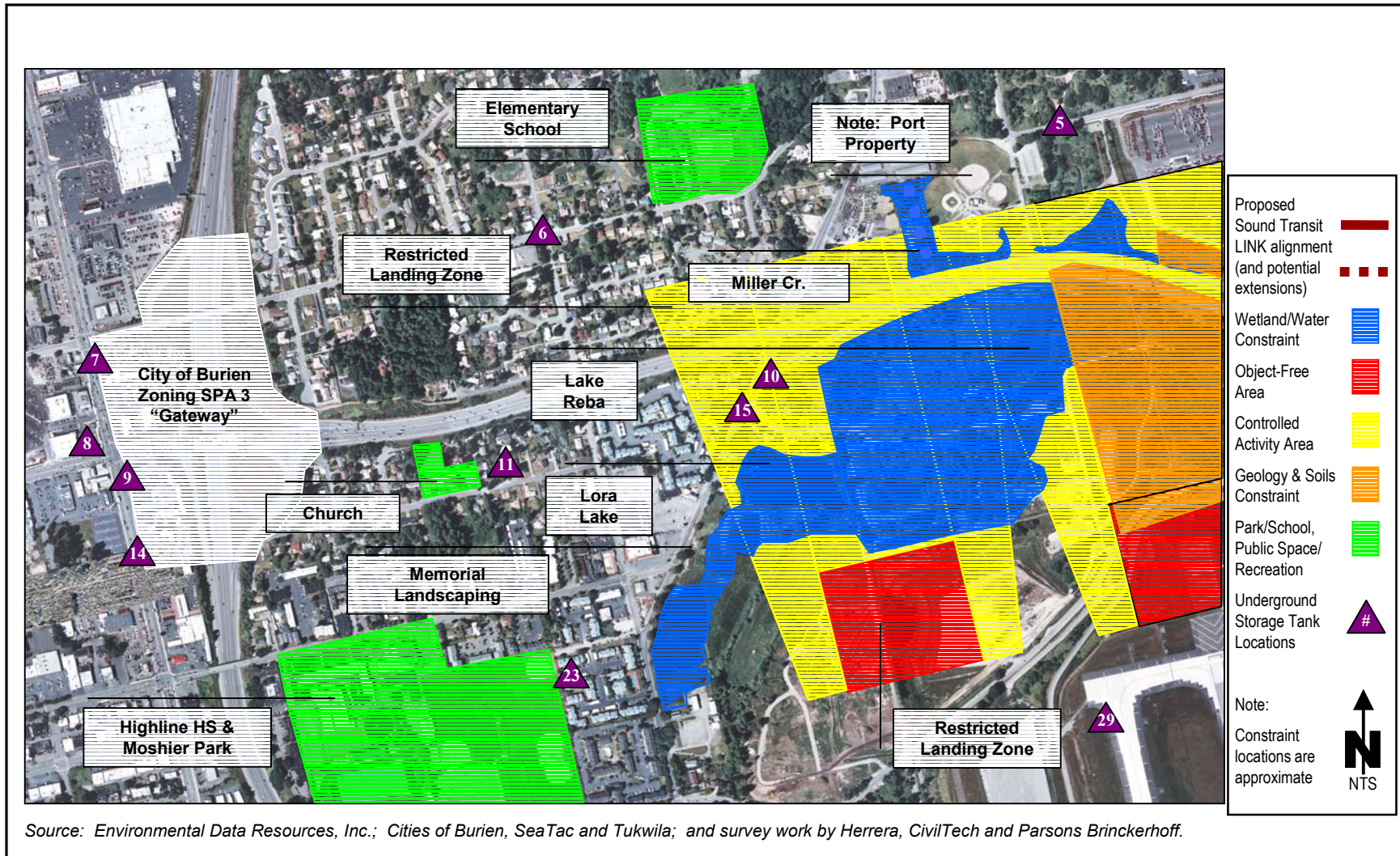
The Des Moines Memorial Drive interchange area is roughly bounded on the west by 8<sup>th</sup> Avenue S; on the north by S 146<sup>th</sup> Street; on the east by 24<sup>th</sup> Avenue S, a collector/neighborhood arterial; and to the south by S 156<sup>th</sup> Street and the Airport. Improvements to this interchange would likely affect northeast Burien neighborhoods, the Riverton Heights neighborhood of SeaTac, and traffic to and from Airport-related facilities, as well as the two SR 518 adjacent interchanges at SR 509 and S 154<sup>th</sup> Street.

#### **S 154<sup>TH</sup> ST/AIRPORT/SR 99 INTERCHANGE**

The zone of influence for the S 154<sup>th</sup> Street/Airport/SR 99 interchange could be considered to be regional, due to SR 518's role as the primary network access point to the Seattle-Tacoma International Airport. These three interchanges are bound together by close proximity; by operations and sharing of ramps; and by the split interchange configuration of S 154<sup>th</sup> Street

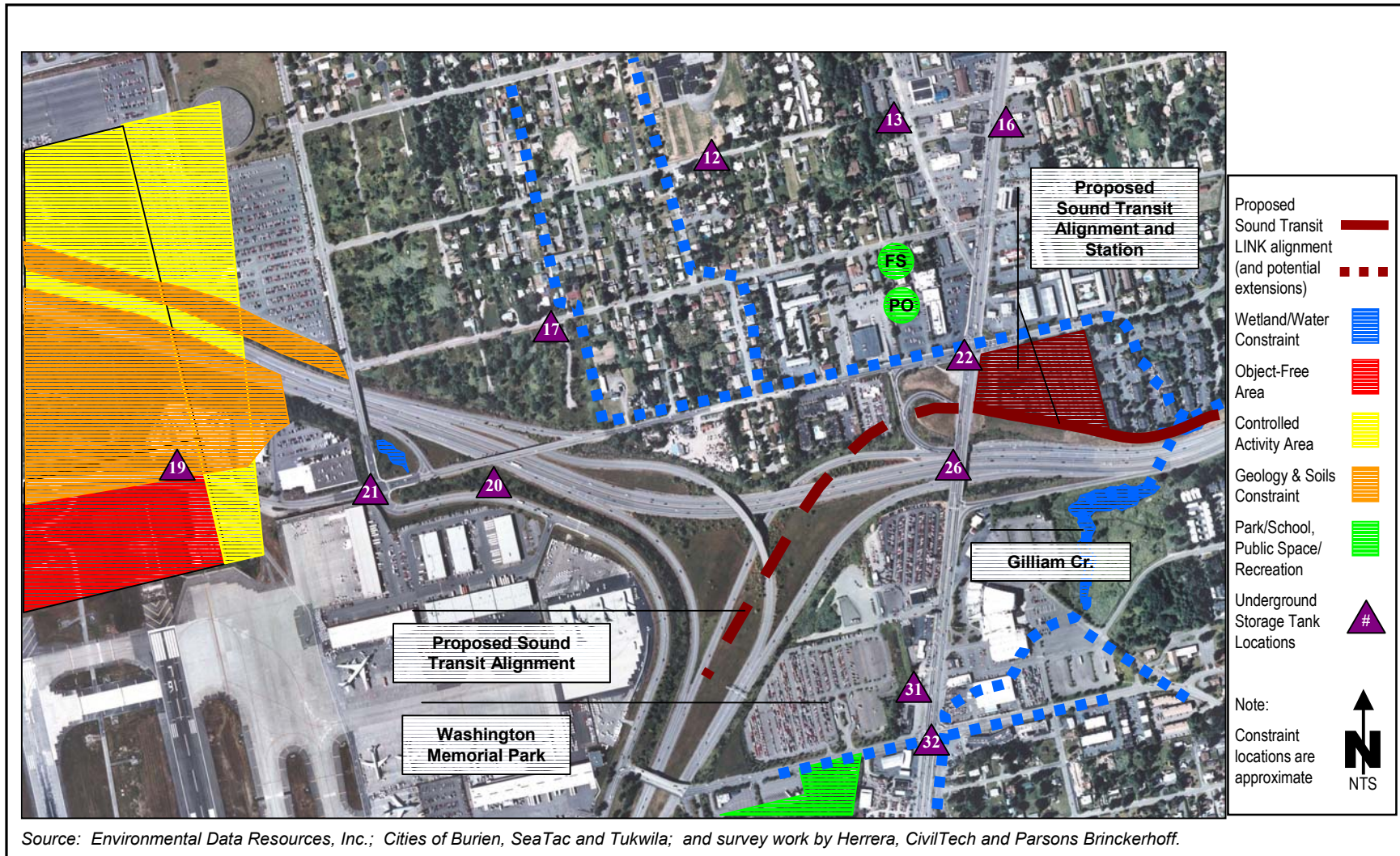


**Figure 4.8a**  
**Environmental Constraints Map**



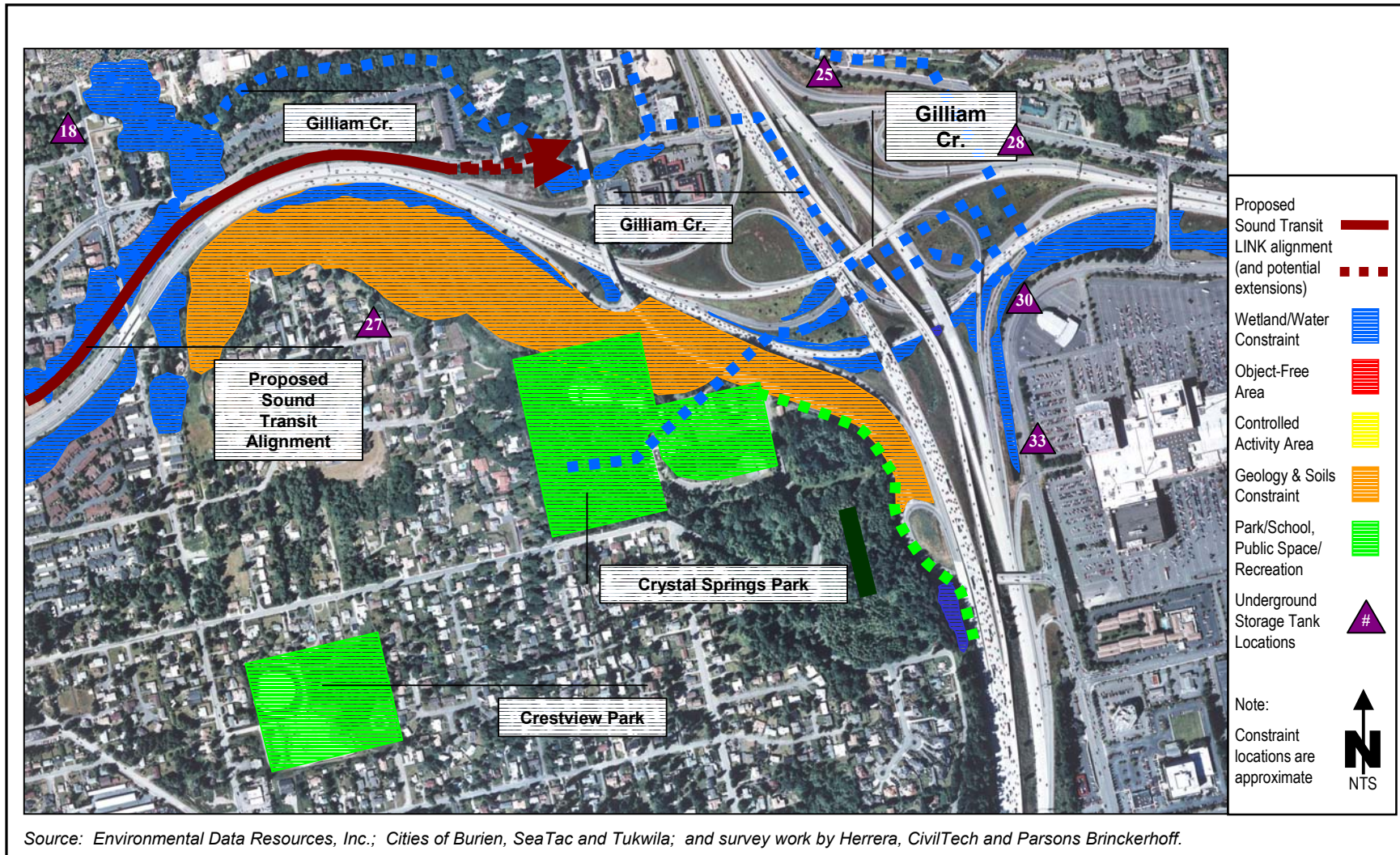


**Figure 4.8b**  
**Environmental Constraints Map**





**Figure 4.8c**  
**Environmental Constraints Map**



### **Figure 4.8d Environmental Constraints Map**

#### **Underground Storage Tank Locations**

The following sites are listed as UST/RCRIS sites - Underground Storage Tanks and Resource Conservation and Recovery Information System. These tanks have no history of leaks or spillage. There are no concerns regarding these sites at this time:

6	20	27
10	21	30
11	22	
19	26	

The following sites are listed as LUST sites – Leaking Underground Storage Tanks:

2	23
7	32
16	33
17	

The following sites are listed as LUST-RA sites – Leaking Underground Storage Tanks which has received Remedial Action from either the owner or operator of the site. The remedial action has been conducted without departmental oversight or approval and are not under an order or decree:

1	9	15	31
3	12	18	
5	13	25	
8	14	28	

*Source: Environmental Data Resources, Inc. data compiled by Parsons Brinckerhoff.*

providing access to and from the west and SR 99 providing access to and from the east. The immediate local influence area is roughly bounded on the west by Des Moines Memorial Drive, on the north by S 144<sup>th</sup> Street, a collector/neighborhood arterial, on the east by 42<sup>nd</sup> Avenue S, a collector/neighborhood arterial, on the south by S 160<sup>th</sup> Street, a minor arterial, and to the southwest by and including the Airport. Improvements to this interchange area would affect operations of the entire corridor, as well as the SeaTac neighborhoods of Riverton Heights and McMicken Heights, the Tukwila neighborhoods of Foster and Thorndyke, and all Airport-related traffic. Improvements to operations could beneficially affect the Tukwila interchange.

### **TUKWILA (I-5) INTERCHANGE**

The Tukwila interchange, comprised of the 51<sup>st</sup> Avenue S and I-5/I-405 interchanges, likewise has a regional zone of influence well beyond local influence. Any changes to this interchange would affect/benefit the I-5 and I-405 corridors, the Airport, the communities of Renton, Tukwila, SeaTac, and Burien, and the Southcenter commercial district. The immediate local influence area would extend west to SR 99, north to the SR 599 interchange, East to the SR 181 interchange, and south to the S 188<sup>th</sup> Street interchange, which also provides south access to the Airport. Local communities within this area would include the Foster and Thorndyke neighborhoods of Tukwila, and the Black River Junction, Earlington, and Renton Junction neighborhoods of Renton and South King County.

## **4.4 PRESENT OPERATING CONDITIONS**

Existing operating conditions were identified as part of a previous study effort (SR 518/SR 99 Corridor Study, WSDOT, December 1999) and are summarized here.

### **4.4.1 SR 518**

Existing peak-hour traffic volumes on the western portion of SR 518 (west of Sea-Tac Airport) are well below facility capacity (defined as having a volume / capacity ratio (V/C) of less than 1.0) during both the AM and PM peak. Volumes approach capacity and mainline congestion increases moving eastward through the corridor. Daily and peak hour traffic volumes are presented in Appendix B, Figures B.14 through B.16.

Level-of-service (LOS) calculations were performed using *Highway Capacity Software* (HCS), Version 3.1, for the SR 518 mainline, ramps, and adjacent intersections. LOS can range from LOS A, which reflects free-flow operating conditions, to LOS F, which reflects over-capacity or failing operations. Peak hour LOS calculations are presented in Tables 4.5 through 4.7.

Traffic flows show distinctly different patterns for the western and eastern halves of the facility. The maximum traffic load section of the corridor is between the SR 99 and 51<sup>st</sup> Avenue S interchange ramps. The eastern section of the corridor (east of the Airport) carries about 61 percent of the daily traffic, 35 percent of which is headed to/from the Airport. Traffic headed out of the Airport onto the SR 518 facility splits 20/80 to the west and east, respectively. Existing daily traffic distribution along the corridor is presented in Figure 4.9.

**Table 4.5**  
**Existing Freeway Mainline Segment Level of Service**

<b>Mainline Segment</b>	<b>Eastbound</b>		<b>Westbound</b>	
	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
NB SR 509 through Des Moines Memorial Drive S	C	C	C	D
Des Moines Memorial Drive S through S 154th Street	C	C	B	C
Off-Ramp to Airport through on-ramp from Airport	analysis not performed		analysis not performed	
Airport through SR 99	analysis not performed		n/a	
SR 99 through 51st Ave S	E	E	analysis not performed	

Source: Parsons Brinckerhoff

**Table 4.6**  
**Existing Freeway Ramp Merge/Diverge LOS - EB**

<b>Mainline Location</b>	<b>AM Peak Hour</b>	<b>PM Peak Hour</b>
On-Ramp from NB SR 509	C	B
On-Ramp from Des Moines Memorial Drive S	B	A
Off-Ramp to 154th Street	B	B
Off-Ramp to North Airport Expressway	A	A
On-Ramp from North Airport Expressway	C	C
On-Ramp from SR 99	E	E
Off-Ramp to 51st Avenue S	E	E/F
Off-Ramp to NB I-5	D	D
Off-Ramp to SB I-5	C	C

Source: Parsons Brinckerhoff

Vehicle occupancy and classification counts were collected by the Washington State Transportation Center in September of 1999 at two points along the corridor, one to the east and one to the west of the Airport interchange. HOVs ranged from 13 to 34.5 percent (with the high during the westbound PM peak on the eastern portion of the facility) of the overall traffic stream. Truck percentages ranged from three to eight percent (with the high during the westbound AM peak on the western portion of the facility) of the overall traffic stream. The results of those counts are presented in Table 4.8.

**Table 4.7**  
**Existing Freeway Ramp Merge/Diverge LOS - WB**

<b>Mainline Location</b>	<b>AM Peak</b>	<b>PM Peak</b>
	<b>Hour</b>	<b>Hour</b>
On-Ramp from NB I-5	D	F
Off-Ramp to SB I-5	D	F
On-Ramp from SB I-5	D/E	E/E
On-Ramp from 51st Avenue S	D/E	E/E
Off-Ramp to SR 99/154th/North Airport Expressway	D/E	E/E
On-Ramp from North Airport Expressway/154th	B	B
Off-Ramp to Des Moines Memorial Drive S	A	B
Off-ramp to NB SR 509	B	C

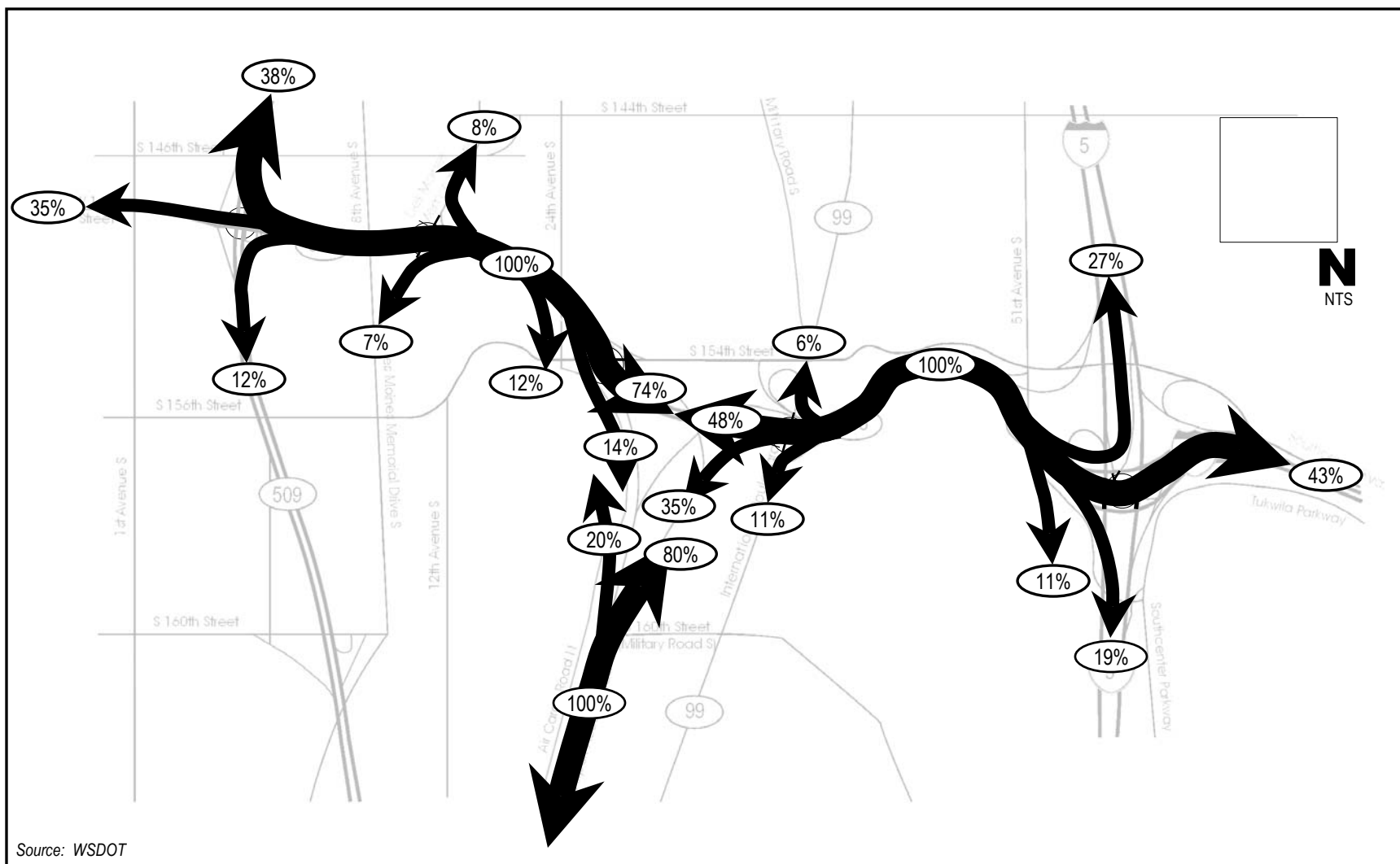
Source: Parsons Brinckerhoff

**Table 4.8**  
**SR 518 Existing Occupancy & Classification**

Count Location	Number of Occupants				Vanpool/ Transit/Bus/ Other	Motorcycle	Truck
	1	2	3	4+			
<b>24th Avenue S Overpass</b>							
<b>AM Peak Period</b>							
Eastbound	78.1%	13.0%	1.4%	0.5%	0.9%	0.3%	5.8%
Westbound	78.9%	10.9%	0.9%	0.1%	1.1%	0.2%	8.0%
<b>PM Peak Period</b>							
Eastbound	67.2%	23.5%	3.4%	0.8%	0.4%	0.4%	4.3%
Westbound	75.6%	18.0%	1.7%	0.2%	0.7%	0.5%	3.2%
<b>51st Avenue S Overpass</b>							
<b>AM Peak Period</b>							
Eastbound	79.4%	14.0%	0.7%	0.2%	0.7%	0.2%	4.8%
Westbound	69.7%	20.1%	1.3%	0.2%	1.3%	0.2%	7.4%
<b>PM Peak Period</b>							
Eastbound	73.7%	19.1%	2.3%	0.7%	1.0%	0.2%	3.0%
Westbound	61.0%	27.5%	4.2%	1.5%	1.2%	0.2%	4.3%

Source: TRAC, September 1999.

**Figure 4.9**  
**Existing Daily Traffic Distribution for SR 518**



## **ACCIDENT HISTORY**

Accident statistics were analyzed for the SR 518 corridor for 1996 through 1998. Within this three-year period, 811 collisions were reported, including three fatalities. Rear-end accidents were the predominant type of collision (42%), followed by at-angle (26%) and hitting appurtenances (23%). Nearly twice as many collisions occurred in the eastbound direction than in the westbound direction. The overwhelming majority of accidents took place on the mainline and ramps in the Airport interchange area.

The WSDOT Year 2000 Safety Analysis located eight high accident locations (HALs), as well as one high accident corridor (HAC), on the SR 518 facility. The HAC occurred between Des Moines Memorial Way S and SR 99, in both mainline directions. All but one of the HALs occurred on ramps. HALs and HACs are presented along with the WSDOT proposed mitigating actions in Table 4.9.

### **4.4.2 Adjacent Intersections**

AM and PM peak hour turning movement volumes at adjacent intersections are presented in Appendix B, Figures B.17 and B.18. These intersections were also analyzed using HCS. All but two arterial intersections were found to operate at LOS D or better. The intersections of SW 148<sup>th</sup> Street/1<sup>st</sup> Avenue S and Des Moines Memorial Drive/SR 518 westbound off-ramp were both operating at LOS E during the PM peak. Arterial intersection levels-of-service are presented in Table 4.10.



## Table 4.9

SR 518 High Accident Locations and Corridors, Year 2000 Analysis	
Location	Notes
<b>Ramps</b>	
<b>Eastbound/Westbound Off-Ramp to SB SR 509</b>  Ramp MP: 0 - 0.330 Review Time Period: 1997 - 1998	80% of accidents involved collisions between westbound left-turning vehicles and eastbound through vehicles, occurring during the permissive phase of a protected/permitted left-turn.  <b>Proposed Action:</b> Ramp was resurfaced and guardrail and signage were installed in 1997; rumble strips were also installed on westbound SR 518. The 4-section left-turn head was replaced with a 5-section during late 1998 or early 1999. Left-turns are still protected/permissive, and will be reviewed for possible conversion to protected-only left-turn phasing when all accident data for 1999 is available.
<b>On-Ramp from SR 509</b>  Ramp MP: 0.220 - 0.440 Review Time Period: 1997 - 1998	Entering at an angle accidents accounted for 80% of collisions. These involved through-vehicles on westbound SR 518 violating a red light and colliding with southbound vehicles turning left onto eastbound SR 518.  <b>Proposed Action:</b> Ramp was resurfaced and guardrail and signage were installed in 1997; rumble strips were installed on westbound SR 518 in 1999. Results of rumble strip installation to be reviewed when all accident data for 1999 is available. <b>Next step to be installation of flashing advisory sign.</b>
<b>Eastbound Off-Ramp to S 154th Street</b> Ramp MP: 0.090 - 0.180 Review Time Period: 1997 - 1998	Predominant accident type was angle collisions at the end of the ramp. <b>Proposed Action:</b> Ramp was resurfaced in 1997 and speed advisory sign relocated in 1999. No evidence of continuing problem; no further action recommended.
<b>On-Ramp from SR 99</b>  Ramp MP: 0 - 0.400 Review Time Period: 1997 - 1998	Rear-ends accounted for 44% and side-swipes for 33% of collisions; all but one occurring at end of ramp where merge with mainline occurs, and where construction was taking place during review period and lanes were therefore narrowed.  <b>Proposed Action:</b> Intersection at ramp terminus was signalized in 1995 and unprotected left turns eliminated. Ramp was repaved in 1997 or 1998. Location to be reviewed when data for 1999 is available.
<b>Off-Ramp to 51st Avenue S</b> Ramp MP: 0.100 - 0.210 Review Time Period: 1997 - 1998	Predominant accident type was angle collisions at the end of the ramp. <b>Proposed Action:</b> Trees were removed in 1997. Ramp was resurfaced in 1997-98. <b>Advisory signs, rumble bars, and revised arrow to be installed.</b>
<b>Westbound Off-Ramp to NB SR 509</b> Ramp MP: 0.320 Review Time Period: 1997 - 1998	Fixed object and overturns accounted for 67% of collisions, indicative of excessive speed. <b>Proposed Action:</b> Ramp was resurfaced and guardrail and signage were installed in 1997. <b>Ramp to be ballbanked and advisory signs posted.</b>
<b>WB Off-Ramp to S 154th/ SR 99</b>  Ramp MP: 0.050 - 0.110 Review Time Period: 1997 - 1998	Rear-ends accounted for 75% of collisions.  <b>Proposed Action:</b> Ramp was resurfaced and rumble strips installed on the right shoulder of the curve radius to southbound SR 99 in 1998. Striping revisions were also made near the end of the ramp in summer of 1998. <b>Right edge stripe to be redone with raised markers of rumble pattern, and additional raised markers to be installed on the shoulder to augment existing.</b>

**Table 4.9 (cont.)**

<b>Mainline</b>	
<b>Eastbound/Westbound East of Des Moines Way to SR 99</b> MP: 1.000 - 2.500 Review Time Period: 1993 - 1997	Rear-end accidents accounted for 32% of collisions. One fatality occurred in 1995 from a vehicle entering the airport on-ramp from the ramp's right shoulder. <b>Proposed Action:</b> Eastbound off-ramp to S 154th re-paved and signage revised. Westbound off-ramp to southbound SR 99 re-paved in 1998 and rumble strips installed on shoulders; speed advisory signage was also revised in spring of 1998. Eastbound on-ramp from SR 99 has recently been re-constructed. <b>Recommendations are to install additional rumble treatment on westbound off-ramp to southbound SR 99, and to monitor eastbound on-ramp from SR 99.</b>
<b>Eastbound 51st Avenue S Interchange Vicinity</b> MP: 3.150 - 3.670 Review Time Period: 1997 - 1998	Rear-ends accounted for 65% and side-swipes for 13% of collisions. <b>Proposed Action:</b> This portion of SR 518 was under construction for most of review period, including repaving, and guardrail and illumination replacement. Accident data to be reviewed when available for 1999 to ensure HAL was construction-related.

Source: WSDOT data compiled by Parsons Brinckerhoff

**Table 4.10**  
**Existing Adjacent Intersection Level of Service**

<b>Location</b>	<b>Signalized</b>		<b>AM Peak Hour</b>		<b>PM Peak Hour</b>	
	<b>Exist.</b>	<b>Fut.</b>	<b>LOS</b>	<b>Delay (secs.)</b>	<b>LOS</b>	<b>Delay (secs.)</b>
SW 148th Street/1st Avenue S	X	X	D	42	E	54
SW 148th Street/SR 509 SB Ramps	X	X	D	39	D	42
SW 148th Street/SR 509 NB Ramps	X	X	C	25	C	23
Des Moines Memorial Drive S/WB Off-Ramp		X				
Unsignalized			B	13	E	42
Signalized			analysis not performed		analysis not performed	
Des Moines Memorial Drive S/EB On-Ramp			A	9	A	9
S 154th Street/24th Avenue S	X	X	analysis not performed		analysis not performed	
S 154th Street/EB Off-Ramp			B/C	16	C/D	24
S 154th/WB Off-Ramp			analysis not performed		analysis not performed	
SR 99/S 154th Street	X	X	analysis not performed		D	48
SB SR 99/EB On-Ramp			analysis not performed		analysis not performed	
51st Avenue S/WB On-Ramp			A	8	B	11
51st Avenue S/EB Off-Ramp			B/C	15	D	28

Source: Parsons Brinckerhoff

## V. FUTURE BASELINE

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This section discusses future conditions for SR 518 and the surrounding study area. This includes a description of local and state plans and a discussion of future traffic conditions, including forecast AM and PM peak-hour volumes and LOS for the freeway and adjacent arterials. This information is presented for both the No Action and No Action Plus (which includes the SR 509 extension south to I-5) scenarios, which are discussed in more detail below.

### 5.1 PLANS AND PROGRAMS AFFECTING THE STUDY AREA

#### 5.1.1 Local Jurisdictional Plans

Land use and comprehensive plan maps for the cities of Burien, SeaTac, and Tukwila were reviewed to verify existing/proposed zoning and land uses against project compatibility. Jurisdiction representatives on the Project Advisory Committee were also consulted to ascertain the existence of planned elements that would affect the concepts evaluated in this study. A detailed review of plans and policies of the comprehensive plans for each city will be done during the EA phase of project implementation for the land use technical report. King County and the Port of Seattle plans will also be reviewed for compatibility during subsequent phases.

#### 5.1.2 State Plans

The *State Highway System Plan, 1999-2018* (and the December 1999 update), and *Washington's Transportation Plan, 1997-2016* (and the February 1999 update) were reviewed for compliance on mobility, safety, economic initiative, and environmental retrofit issues.

### MOBILITY

The *State Highway System Plan* (HSP) mobility service objective is to improve mobility within congested highway corridors. The action strategies described in the HSP that are applicable to the route are:

- Complete the freeway Core HOV lane system in the Puget Sound region.
- Mitigate congestion on urban highways in cooperation with local and regional jurisdictions when the peak period LOS falls below D.
- Provide bicycle connections along or across state highways within urban growth areas to complete local bicycle networks.
- In partnership with others, mitigate in the most cost-effective way the impacts from local economic development to preserve the capacity and safety of the highway system.

The *Washington Transportation Plan* identifies specific state-interest action strategies that may improve mobility within the route corridor, including improvements to state highways, the state airport system, public transportation system, intercity rail passenger service, and bicycle and pedestrian transportation. Increased transit and rail service, non-motorized improvements, and increases in freight movement by rail could all improve mobility within the SR 518 corridor.

## **SAFETY**

State facilities in the study area which have been targeted for accident prevention/reduction improvements in the HSP. They include continued monitoring on I-5 from the Tukwila to the Interurban interchange (currently an HAL), addition of a northbound to westbound loop at the SR 518 interchange with SR 99 (currently an HAL), and installation of guardrail on westbound SR 518 in the vicinity of SR 99.

There are no sections on SR 518 currently included in the WSDOT Highway Corridor Safety Program, which normally does not address safety issues on limited access facilities. There is a segment of SR 99 falling within the study area which has been identified in this program. This is a pedestrian accident corridor which stretches from Federal Way all the way north to SR 599, and received a high number of fatal and disabling injuries in the mid 1990's. SR 99 in the study area experiences a large amount of pedestrian traffic just to the north of the SR 518 interchange. The City of Tukwila has addressed this area with median treatments to channelize traffic movements and provide pedestrians with a mid-street refuge, calming traffic through this area.

1998 HSP safety recommendations are considered superceded by the Year 2000 HAL/HAC Analysis summarized in Section IV.

## **ECONOMIC INITIATIVE**

There are no freight and goods or tourism improvements currently listed for state facilities in the study area in the HSP.

## **ENVIRONMENTAL RETROFIT**

There are no environmental retrofit improvements currently listed for state facilities in the study area in the HSP.

## **5.2 FUTURE BASELINE OPERATING CONDITIONS**

Operational analyses were previously performed in the *SR 518/ SR 99 Corridor Study* on forecast future conditions and presented in the *Future Baseline* report. This analysis was performed for the forecast year 2020, however, while 2025 has been established as the forecast year for the SR 518 RDP. Therefore, a set of updated volume forecasts and operational analyses were generated for 2025. Two separate sets of baseline conditions were forecast and analyzed, as follows:

- **2025 No Build** – This alternative consists of no improvements to the area network other than those projects identified in the Airport Master Plan Update and 6-year Transportation Improvement Plan and land use development plans of the surrounding cities, King County, WSDOT, and the Puget Sound Regional Council. It assumes completion of Sound Transit Phase 1 regional transit plans, including light rail from S 200<sup>th</sup> Street north via the Airport. The mainline and ramps along SR 518 are assumed to retain their current configurations.
- **2025 No Build Plus** – This alternative is identical to the above with the addition of two improvements: An SR 509 extension to the south and east to I-5 in the vicinity of S 208<sup>th</sup> Street, and the added South Airport Access road. These two improvements are anticipated to result in traffic redistribution throughout the corridor.

### **5.2.1 No Action**

Forecast baseline traffic volumes (daily and peak-hour) for 2025 on SR 518 under No Action conditions are presented in Appendix C, Figures C.1 through C.3. Under 2025 No Action conditions, SR 518 is forecast to operate within capacity ( $V/C < 1$ ) during both peak periods, except for the eastbound lanes between SR 99 and the Tukwila interchange.

Level-of-service calculations were performed using HCS (version 4.1) for the SR 518 mainline, ramps, and adjacent intersections. During both the AM and PM peak hours, mainline congestion continues to be worse on the eastern half of the facility, with service levels generally one to two LOS grades poorer than under existing conditions. Freeway peak hour LOS calculations are presented in Tables 5.1 through 5.4.

AM and PM peak hour turning movement volumes at adjacent intersections are presented in Appendix C, Figures C.4 and C.5. These intersections were analyzed using HCS 4.1. Unlike the existing conditions, three of these intersections during the AM peak, and six during the PM peak, are forecast to operate at LOS E or F. Arterial intersection levels-of-service are presented in Table 5.5.

### **5.2.2 No Action Plus**

Future baseline peak-hour traffic volumes on SR 518 under No Action Plus are reduced from those forecast under the No Action scenario due to redistribution of traffic onto the new network segments. SR 518 is forecast to be under capacity during both peaks in both directions except for the eastbound lanes between SR 99 and the Tukwila interchanges during the PM peak. Daily and peak hour traffic volumes are presented in Figures 5.1 through 5.3.

Level-of-service calculations were performed using HCS (version 4.1) for the SR 518 mainline, ramps, and adjacent intersections. During both the AM and PM peak hours, mainline congestion continues to be worse on the eastern half of the facility, with service levels one to two grades better than they were under No Action in many areas. Peak hour LOS calculations are presented in Tables 5.1 through 5.4.

AM and PM peak hour turning movement volumes at adjacent intersections are presented in Figures 5.3 and 5.4. These intersections were analyzed using HCS 4.1. Very similar to the No Action, four of these intersections are forecast to operate at LOS E or F during the AM peak, and six during the PM peak. Arterial intersection levels-of-service are presented in Table 5.5.

## **5.3 LOCAL ARTERIAL NETWORK**

### **5.3.1 Description**

The SR 518 corridor provides the primary east-west connection between Burien and Tukwila, where it connects to I-5 and I-405. SR 518 is also the regional connection to the Seattle-Tacoma International Airport, and will most likely continue to be so, even after the planned improvements to SR 509 and the South Airport Expressway

In part due to the physical barrier presented by SeaTac airport, alternate east-west corridors are limited. South 154<sup>th</sup>/156<sup>th</sup> Street is the only parallel, east-west through-corridor in the study

area. Access from SR 518 is provided to S 154<sup>th</sup> Street at the SR 99 (to/from the east) and S 154<sup>th</sup> Street (to/from the west) interchanges. Additional local east-west access to areas of SeaTac and Burien are provided by local streets and minor collectors, including S 146<sup>th</sup> Street, S 152<sup>nd</sup> Street, and S 160<sup>th</sup> Street in Burien, and S Military Road and S 170<sup>th</sup> Street (to the airport) in SeaTac. North-south corridors in the study area are more extensively developed. From east to west, major north-south arterials are 51<sup>st</sup> Avenue S, SR 99, 24<sup>th</sup> Avenue S, Des Moines Memorial Drive, and 1<sup>st</sup> Ave S.

**Table 5.1**

**Eastbound Freeway Mainline Segment Level of Service**

Mainline Segment	AM Peak Hour				PM Peak Hour			
	1998/99	2020 Baseline	2025 No Action	2025 No Action+	1998/99	2020 Baseline	2025 No Action	2025 No Action+
On-Ramp from NB SR 509 through on-ramp from Des Moines Memorial Drive S	C	D	C	C	C	D	C	B
On-Ramp from Des Moines Memorial Drive S through off-ramp to S 154th Street	C	C	C	B	C	C	C	B
Off-Ramp to Airport through on-ramp from Airport	analysis not performed		C	B	analysis not performed		C	B
On-Ramp from Airport through on-ramp from SR 99	analysis not performed		F	E	analysis not performed		F	F
On-Ramp from SR 99 through off-ramp to 51st Ave S	E	F	F	F	E	F	F	F
Off-ramp to 51st Ave S through off-ramp to NB I-5	analysis not performed		F	F	analysis not performed		F	F
Off-ramp to NB I-5 through off-ramp to SB I-5	analysis not performed		D	C	analysis not performed		E	D

Source: Parsons Brinckerhoff

**Table 5.2**

**Westbound Freeway Mainline Segment Level of Service**

Mainline Segment	AM Peak Hour				PM Peak Hour			
	1998/99	2020 Baseline	2025 No Action	2025 No Action+	1998/99	2020 Baseline	2025 No Action	2025 No Action+
On-Ramp from NB I-5 through off-ramp to SB I-5	analysis not performed		F	D	analysis not performed		F	F
Off-Ramp to SB I-5 through On-ramp from SB I-5	analysis not performed		D	C	analysis not performed		F	F
On-Ramp from SB I-5 through on-ramp from 51st Ave S	analysis not performed		D	C	analysis not performed		E	E
On-ramp from 51st Avenue S through off-ramp to Airport	E/E	E/F	D	D	E/F	F/F	F	F
Off-ramp to Airport through on-ramp from Airport	analysis not performed		B	A	analysis not performed		D	D
On-Ramp from N Airport Expressway/154th through off-ramp to Des Moines Memorial Drive S	B	C	C	B	C	D	D	C
Off-Ramp to Des Moines Memorial Drive S through off-ramp to NB SR 509	C	C	C	B	D	E	E	D

Source: Parsons Brinckerhoff

**Table 5.3****Eastbound Freeway Ramp Merge/Diverge LOS**

Mainline Location	AM Peak Hour				PM Peak Hour			
	1998/99	2020 Baseline	2025 No Action	2025 No Action+	1998/99	2020 Baseline	2025 No Action	2025 No Action+
On-Ramp from NB SR 509	C	C	C	<b>B</b>	B	C	C	<b>B</b>
On-Ramp from Des Moines Memorial Drive S**	B	B	B	<b>B</b>	A	B	B	<b>B</b>
Off-Ramp to 154th Street	B	C	C	<b>B</b>	B	C	C	<b>B</b>
Off-Ramp to North Airport Expressway	A	A	B	<b>B</b>	A	B	B	<b>B</b>
On-Ramp from North Airport Expressway	C	D	F	<b>D</b>	C	E	F	<b>F</b>
On-Ramp from SR 99	E	F	F	<b>F</b>	E	F	F	<b>F</b>
Off-Ramp to 51st Avenue S	E	F	F	<b>F</b>	E/F	F	F	<b>F</b>
Off-Ramp to NB I-5	D	F	F	<b>F</b>	D	F	F	<b>F</b>
Off-Ramp to SB I-5	C	C*	C	<b>B</b>	C	D*	D	<b>D</b>

\*Actual LOS may be lower due to expected congestion levels on I-405 and related back-ups to SR 518 and this ramp.

\*\*No Action and No Action+ analyzed as basic freeway segments.

Source: Parsons Brinckerhoff

**Table 5.4****Westbound Freeway Ramp Merge/Diverge LOS**

Mainline Location	AM Peak Hour				PM Peak Hour			
	1998/99	2020 Baseline	2025 No Action	2025 No Action+	1998/99	2020 Baseline	2025 No Action	2025 No Action+
On-Ramp from NB I-5	D	F	F	<b>D</b>	F	F	F	<b>F</b>
Off-Ramp to SB I-5	D	F	F	<b>E</b>	F	F	F	<b>F</b>
On-Ramp from SB I-5* **	D/E	E/F	E/F	<b>F</b>	E/E	E/F	D	<b>E</b>
On-Ramp from 51st Avenue S*	D/E	E/F	D	<b>C</b>	E/E	E/F	F	<b>F</b>
Off-Ramp to SR 99/154th/North Airport Expressway*	D/E	E/F	F	<b>F</b>	E/E	E/F	F	<b>F</b>
On-Ramp from North Airport Expressway/154th*	B	C	D	<b>C</b>	B	C	D	<b>D</b>
Off-Ramp to Des Moines Memorial Drive S	A	B	B	<b>B</b>	B	B	C	<b>B</b>
Off-ramp to NB SR 509	B	C	C	<b>B</b>	C	D	E	<b>D</b>

\*Existing and Baseline LOS calculated as part of multiple weave segment between on-ramp from SB I-5 and off-ramp to Airport. First value is for weaving vehicles, ; for non-weaving vehicles.

\*\*No Action and No Action+ analyzed as basic freeway segments.

Source: Parsons Brinckerhoff

**Table 5.5**

**Intersection Level of Service**

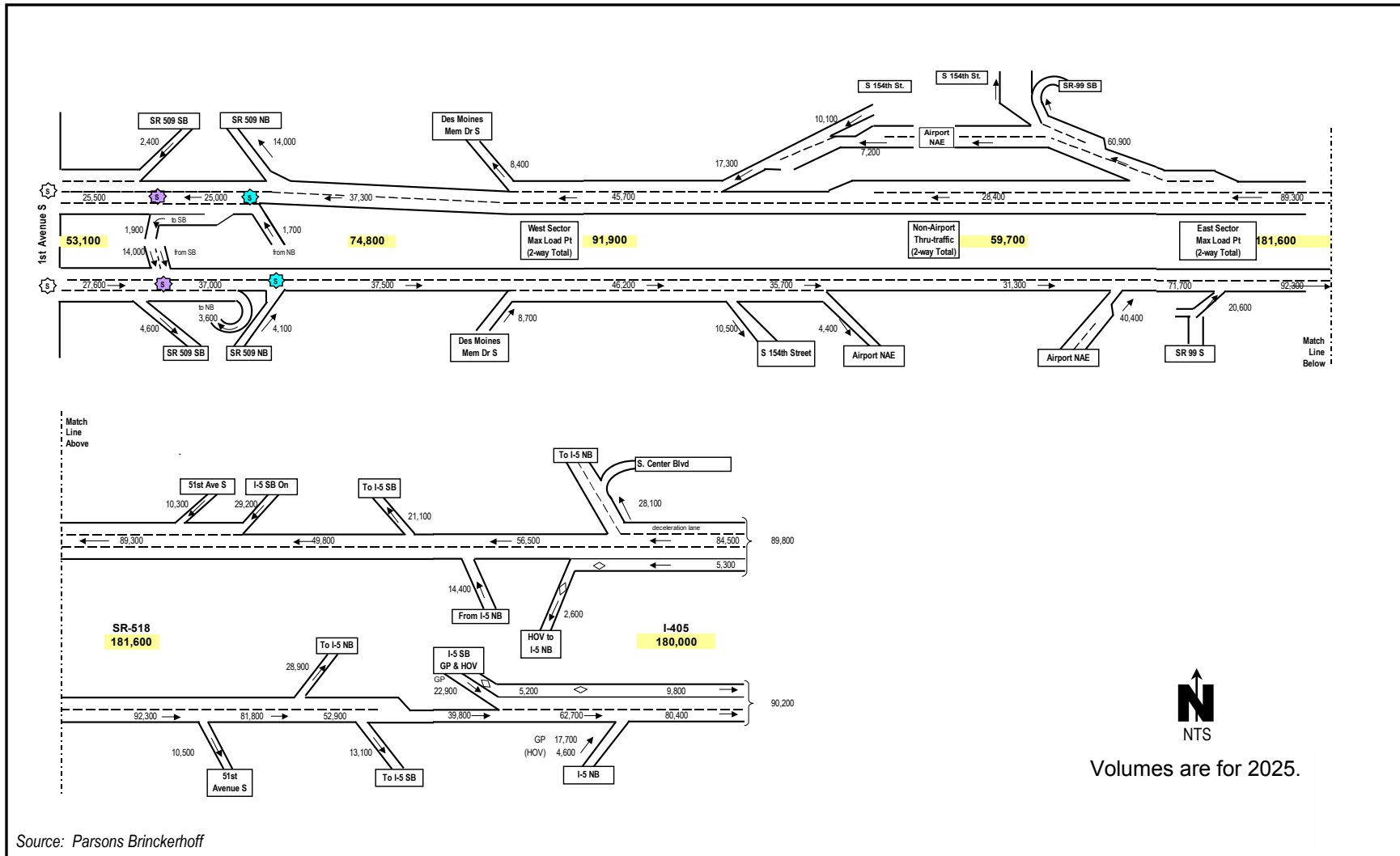
Location	Signalized		AM Peak Hour								PM Peak Hour							
	Exist	Fut	1998/99		2020 Baseline		2025 No Action		2025 No Action+		1998/99		2020 Baseline		2025 No Action		2025 No Action+	
			Delay		Delay		Delay		Delay		Delay		Delay		Delay		Delay	
			LOS	(secs)	LOS	(secs)	LOS	(secs)	LOS	(secs)	LOS	(secs)	LOS	(secs)	LOS	(secs)	LOS	(secs)
SW 148th Street/1st Avenue S	X	X	D	42	D	45	D	50	E	79	E	54	F	82	F	85	F	133
SW 148th Street/SR 509 SB Ramps	X	X	D	39	E	55	E	61	D	51	D	42	F	85	F	83	F	107
SW 148th Street/SR 509 NB Ramps	X	X	C	25	C/D	34	D	42	C	21	C	23	C/D	34	D	36	C	33
Des Moines Memorial Drive S/WB Off-Ramp		X																
Unsignalized			B	13	C	22	D	30	E	45	E	42	analy. not perf.		F	925	F	895
Signalized			analysis not performed				C	27	B	16	analy. not perf.		D	40	D	47	C	30
Des Moines Memorial Drive S/EB On-Ramp			A	9	B	11	B	11	B	12	A	9	B	13	B	13	B	12
S 154th Street/24th Avenue S	X	X	analysis not performed								analysis not performed							
S 154th Street/EB Off-Ramp			B/C	16	D	32	E	41	F	56	C/D	24	F	187	F	267	F	176
S 154th/WB Off-Ramp			analysis not performed								analysis not performed							
SR 99/S 154th Street	X	X	analysis not performed				F	90	F	92	D	48	F	84	F	140	F	139
SB SR 99/EB On-Ramp			analysis not performed								analysis not performed							
51st Avenue S/WB On-Ramp			A	8	A	8	A	8	A	8	B	11	C	17	C	20	C	20
51st Avenue S/EB Off-Ramp			B/C	15	E	40	B	14	B	13	D	28	F	66	E	43	E	44

Note: 1998/99 and 2020 Baseline analyzed under HCS 3.1; 2025 No Action analyzed under HCS 4.1.

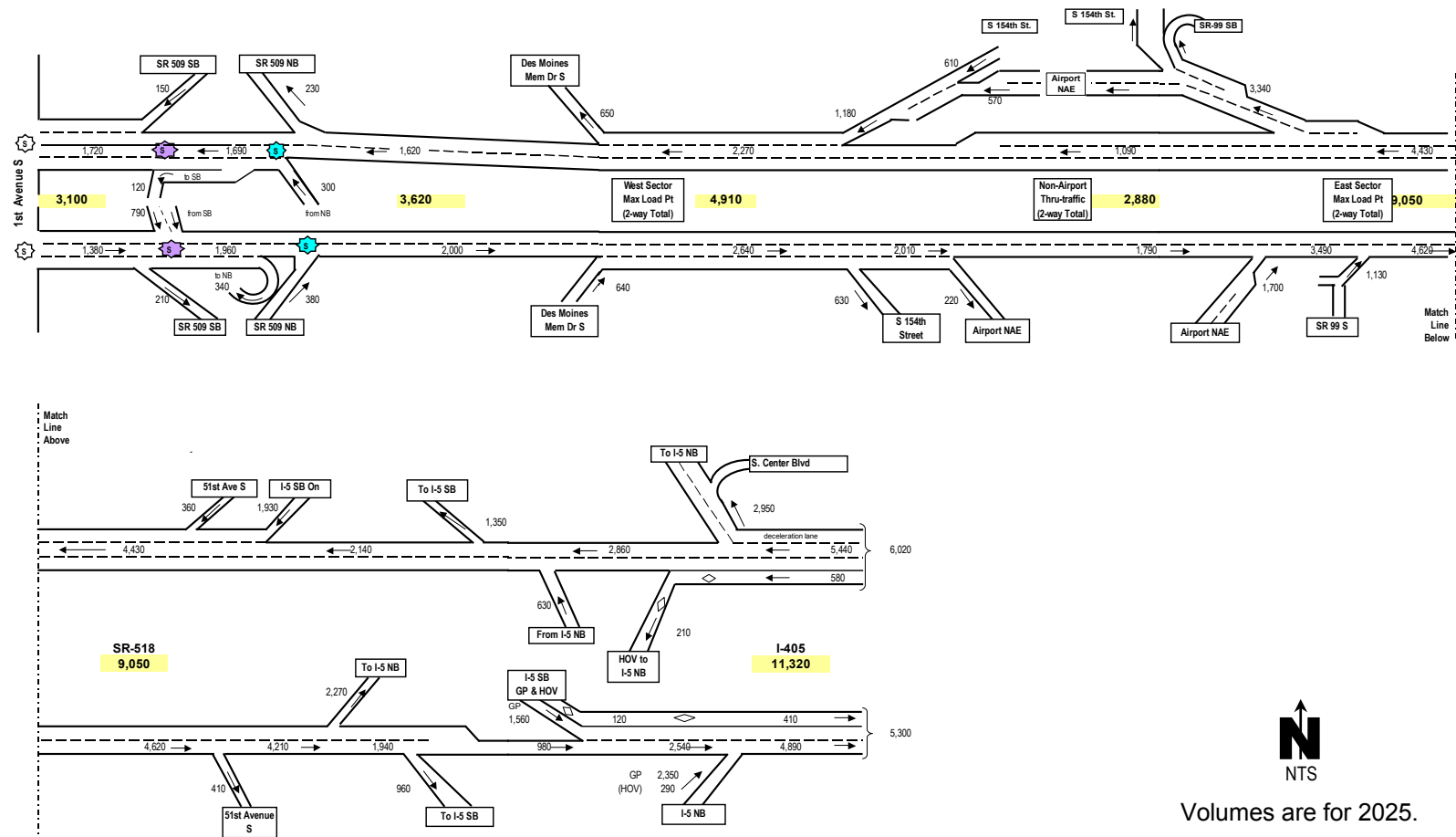
Source: Parsons Brinckerhoff



**Figure 5.1**  
**Future Baseline Average Weekday Ramp and Freeway Volumes**  
**No Action Plus**

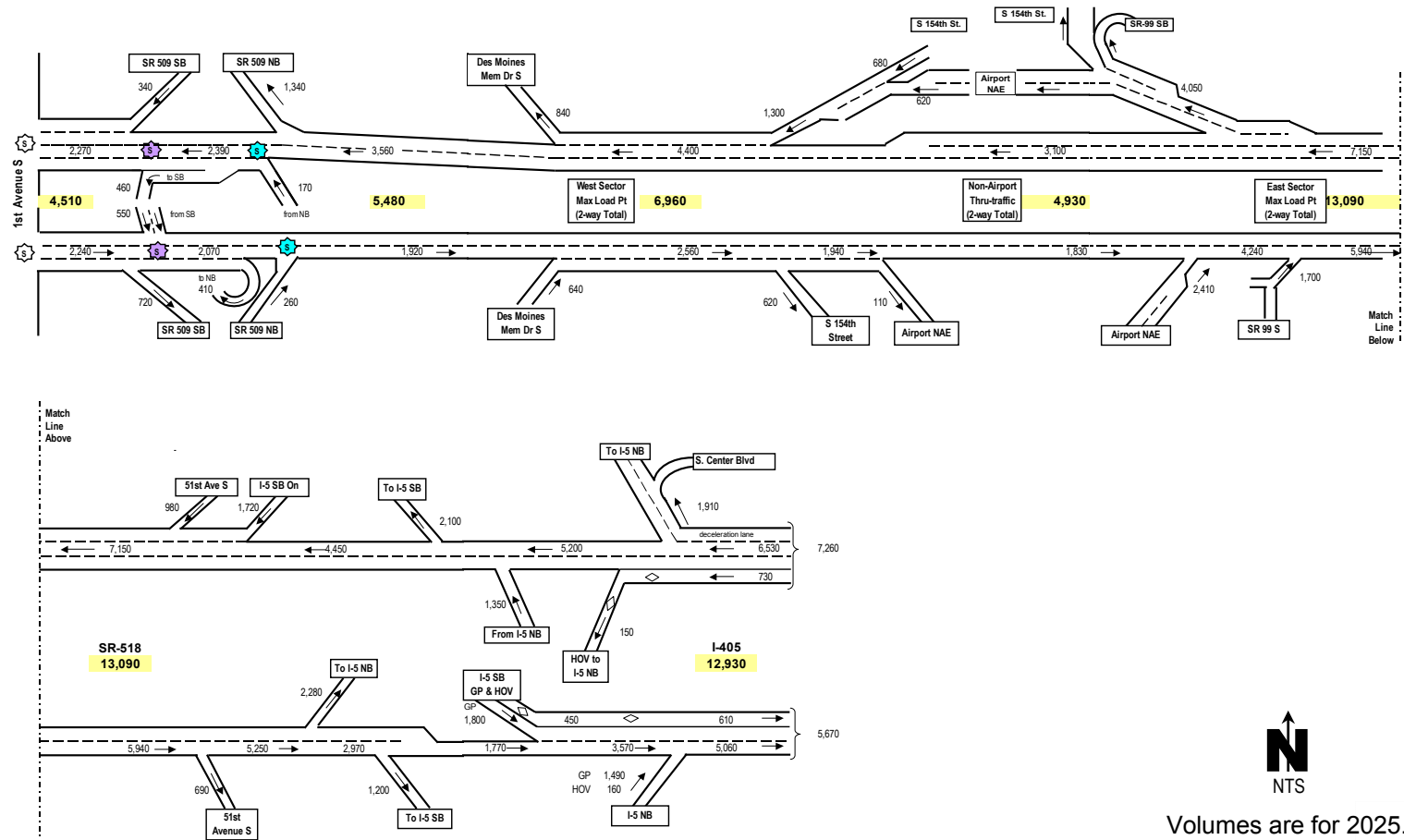


**Figure 5.2**  
**Future Baseline AM Peak Hour Ramp and Freeway Volumes**  
**No Action Plus**



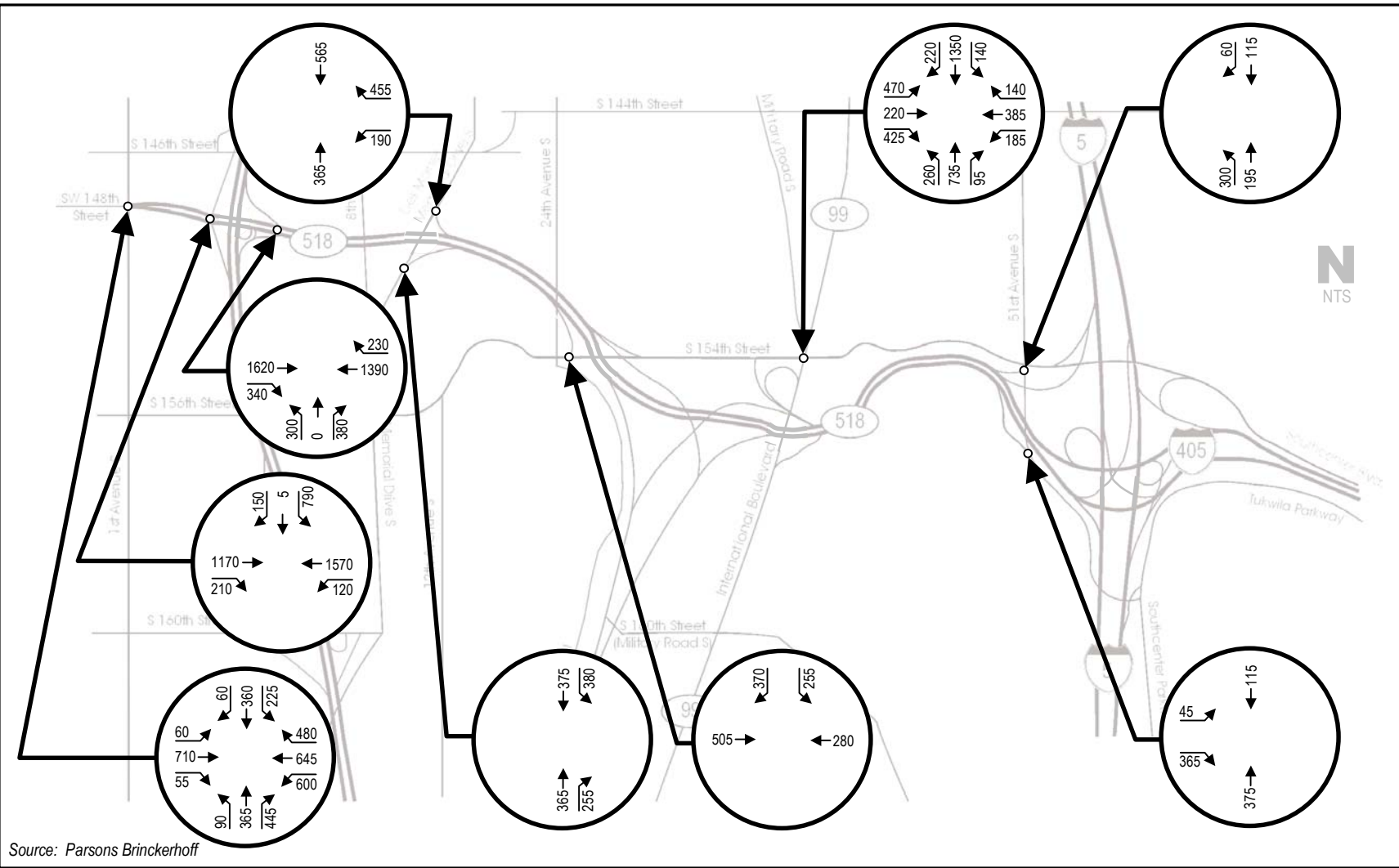
Source: Parsons Brinckerhoff

**Figure 5.3**  
**Future Baseline PM Peak Hour Ramp and Freeway Volumes**  
**No Action Plus**

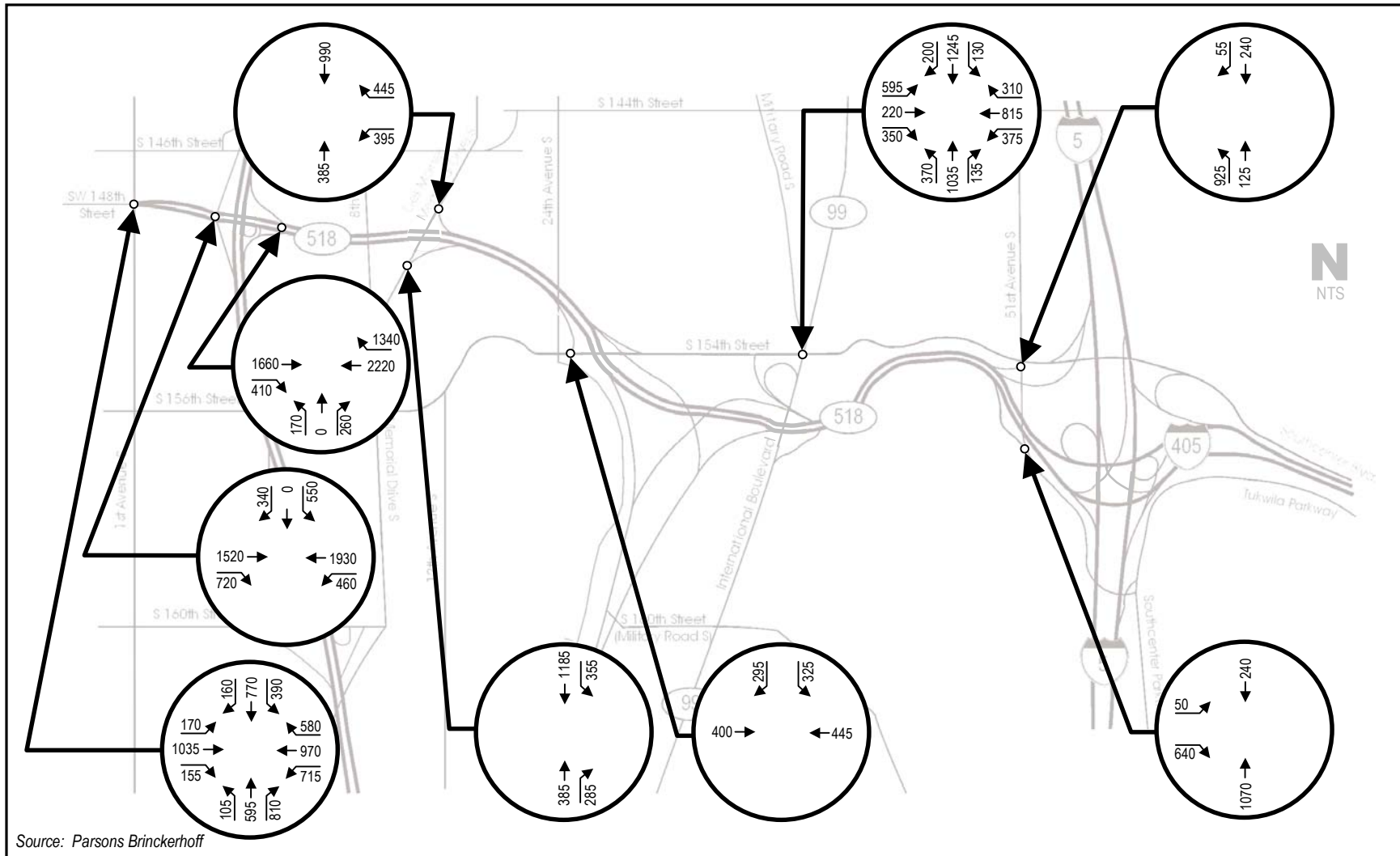


Source: Parsons Brinckerhoff

**Figure 5.4**  
**Future Baseline Arterial Intersection Turning Movement Volumes**  
**No Action Plus – AM Peak Hour**



**Figure 5.5**  
**Future Baseline Arterial Intersection Turning Movement Volumes**  
**No Action Plus – PM Peak Hour**



Level-of-service analyses were conducted at each ramp terminal intersection, as well as at the major intersections of 1<sup>st</sup> Ave S/S 148<sup>th</sup> Street and SR 99/S 154 Street, for future conditions. Results of these analyses were presented in Table 5.5. The major congestion points were found at the intersections of 1<sup>st</sup> Ave S/S 148<sup>th</sup> Street, SR 99/S 154 Street, and S 154<sup>th</sup> Street/SR 518 ramps, all of which are forecasted to operate at LOS E/F by 2025 during both the AM and PM Peak hours. Other study area intersections are forecast to operate at acceptable levels-of-service during both the AM and PM peaks, except for the eastbound 51<sup>st</sup> Ave S off-ramp intersection, which operates at LOS E in the PM under existing traffic controls (stop-controlled intersection).

### **5.3.2 Recommended Areas of Improvement**

Based on review of corridor connectivity, interface needs with proposed interchange improvements, and LOS analyses of select intersections, several areas of focus for potential arterial improvements were identified.

#### **1<sup>ST</sup> AVENUE SOUTH/148<sup>TH</sup> STREET**

- Prohibit left turns onto southbound 1<sup>st</sup> Ave S for traffic exiting from southbound SR 509. High traffic volumes and the short spacing between the ramps and the intersection necessitate this restriction. Instead, vehicles bound for 1<sup>st</sup> Ave S should be directed to the S 146<sup>th</sup> Street interchange.
- Expand intersection capacity. Widening of approaches could reduce intersection delay, particularly by providing additional lanes or turn pockets in the southbound and eastbound directions.

#### **SR 99**

- SR 99 should be expanded to accommodate intersection traffic as required by the selected interchange concept. Traffic analysis indicates that an eight to nine-lane section will be required between S 154th Street and the eastbound ramps to SR 99 to accommodate forecasted traffic volumes. Expansion of the S 154th Street interchange to match the revised configuration to the south would also be necessary.

#### **S 144<sup>TH</sup> STREET ARTERIAL IMPROVEMENTS**

- Completion of the S 144th Street corridor between Des Moines Memorial Drive and 24th Ave S would provide east-west connectivity north of the SR 518 corridor that presently does not exist, as well as provide a second through east-west corridor (connecting to S 146th Street west of Des Moines Memorial Drive).

#### **ARTERIAL ACCESS BETWEEN BURIEN AND DES MOINES MEMORIAL DRIVE.**

Access between Des Moines Memorial Drive and central Burien should be accommodated by arterial access. S 146th Street, S 152nd Street, and S 156th Street all provide direct connections between Burien and Des Moines Memorial Drive, and could be improved with added capacity (lanes and/or turn lanes) and safety features (sidewalks, traffic control) as necessary.



## **VI. IMPROVEMENT CONCEPTS**

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Identification and selection of recommended concepts for the SR 518 corridor are detailed in this chapter. The screening process applied to each concept are presented in Appendix D.

Due to the nature of the SR 518 corridor, it is likely that the concepts recommended in the RDP will represent a build-out scenario in most cases. As such, concepts identified for possible implementation should provide sufficient long-term definition of improvements so that the corridor may continue to meet the needs of the surrounding communities, even as needs evolve over time. It is anticipated that individual improvement elements of the RDP will be processed independently through the environmental, funding, design, and construction phases of project delivery.

### **6.1 EVALUATION CRITERIA**

As described by the statement of purpose and need, this RDP is intended to identify long-range infrastructure improvements needed within the corridor to reasonably accommodate forecast traffic growth, improve traffic operations, and provide adequate access to the communities of Burien, SeaTac, Tukwila, and the Seattle-Tacoma International Airport. Improvements should be developed in a cost effective manner and avoid or minimize impacts to the natural and built environment. Additionally, the RDP should be implementable in phases.

The evaluation criteria were derived directly from the identified purpose, needs, goals, and objectives for the study. These criteria are fairly general, and therefore rely on qualitative measures to a large degree. Their intended purpose is to discern the effectiveness and suitability of the basic concepts considered. The evaluation criteria utilized are described below, organized by objective.

#### **6.1.1 Transportation Improvements**

##### **OBJECTIVE**

Improve mobility and accessibility along the SR 518 corridor and improve connections to the local street system and regional highway and transportation network. Accommodate near-term and long-term (2025) travel demand within the SR 518 Corridor.

##### **CRITERIA**

- Does the concept allow for future modifications of the corridor to meet travel needs through and beyond the 2025 horizon year?
- Is the ability to provide freight connections to and through the corridor improved?
- Are travel routes to specific destinations within the corridor clearly definable/facilitated by the proposed concept design? Is the ability to direct local trips onto appropriate roadways/facilities enhanced?
- Is the ability to meet projected peak-hour demand for travel on SR 518 improved/maintained relative to the future no-build condition?
  - Volume-to-capacity (V/C) ratios
  - Level of service (LOS)
  - Peak-hour delay
  - Unmet peak-hour demand

- Does the concept support transit services in the corridor? Are transit connections enhanced, improved or maintained?
- Are adequate and appropriate HOV or similar managed facilities accommodated within the corridor?
  - HOV demand
  - HOV speed and travel time through the corridor
  - Opportunities for successful HOV facility implementation
  - Bicycle and pedestrian connectivity
  - Opportunities for enhanced pedestrian and bicycle access
- Does the concept limit travel delay?
  - Routing
  - LOS
  - Peak-hour delay (isolated and accumulated).
  - Travel speeds

## **OBJECTIVE**

Avoid or minimize detrimental effects to the natural and built environments. Provide options that allow mitigation of unavoidable impacts.

## **CRITERIA**

- Are there known fatal flaws of an environmental or constructibility nature that would preclude the options from being implemented? (Based on field observations and other available data).
  - Likely conflicts with Federal Aviation Administration (FAA) restrictions.
  - Constructibility
  - Need for formal Endangered Species Act consultation
  - Excessive need for additional right-of-way
  - Other potential fatal flaws of concern to be identified as part of study
- Can impacts to the natural environment be avoided and/or mitigated?
  - Effects on/from geological hazards (number of landslide or seismic hazard areas impacted)
  - Disturbances to hydrology, water quality, and water resources (number of streams crossed, linear feet of stream potentially disturbed, number of groundwater wells impacted)
  - Disturbance to wetlands/jurisdictional waters (acres affected)
  - Effects on threatened and endangered species/wildlife habitat
  - Cumulative impacts to the natural environment
- Can impacts to the built environment be avoided and/or mitigated relative to the level of improved mobility offered by the concept?
  - Can potential disturbance/displacement of known historic, archaeological, and cultural resources be avoided and/or mitigated? Are any 4f resources/features impacted?
  - Can potential number of residential and commercial displacements be minimized and/or mitigated?
  - Can potential effects to low-income and minority households be mitigated? (total number of residences)

- Can potential effects to major utilities be avoided/moved? (number of displacements)
- Can potential effects to aesthetics and visual quality be avoided and/or mitigated?
- Can potential effects to neighborhood and business access, circulation, and emergency services be avoided or minimized and mitigated?
- Can potential effects to air and noise quality be mitigated within the context of the corridor? (VMT/speed/number of sensitive receptors)
- Can effects to/from potential hazardous material sites be avoided or minimized and mitigated?
- Can potential effects to parklands be avoided or mitigated?
- Are potential effects to land use patterns compatible with existing and planned land uses within the corridor? If not, can differences be mitigated? (acres of land, by land use converted to transportation)
- Will effects to potential land development maintain or further the economic vitality of the corridor? Do they reduce or enhance the potential for continued development?
- Cumulative impacts to the built environment.

## **OBJECTIVE**

Generally improve the driving safety characteristics of the corridor.

## **CRITERIA**

- Is the ability to maintain WSDOT design standards provided by the corridor option being considered?
- Can potential vehicle conflicts be reduced?
  - Levels of congestion
  - Projected speeds and variability of speeds within the corridor
  - Number of potential conflict points

## **OBJECTIVE**

Provide compatibility with relevant plans and proposed projects established by neighboring agencies.

## **CRITERIA**

- Is the proposed corridor option compatible with the following plans/programs ongoing within the area? Is there a direct conflict that cannot be resolved through an acceptable modification of the identified plan and would such a modification, if necessary, be likely to occur?
- Would implementation of the proposed corridor option preclude transportation improvements required under one of the following plans?
  - Airport expansion program
  - Sound Transit Link Light Rail
  - City of SeaTac's Phase III improvements on International Boulevard
  - Jurisdictional freeway access needs (City of Burien, SeaTac, Tukwila)
  - City of Burien's vision for a community "gateway"
  - King County Transit plans
  - Other on-going WSDOT projects (SR 509, South Airport Expressway, I-405 Program).

## 6.1.2 Independent Utility

Establish a plan that allows phasing of environmental analysis, funding, and construction of elements.

### **OBJECTIVE**

Identify corridor plans that allow for phasing of improvements over the life of the RDP.

### **CRITERIA**

- Can the long-range corridor improvements be identified as a series of individual projects having independent utility, and can those individual projects be phased over the life of the route development plan? (Qualitative)
  - Do the individual improvements within the corridor represent definable projects that demonstrate independent utility?
  - Can individual improvement projects be identified, and if so does each of them demonstrate logical termini?
  - If individual improvement projects are identified, do they require other construction projects be implemented to be functional on their own merit?
  - If individual improvement projects are identified, do they provide improvements to the transportation system of a cost effective nature, with or without the other proposed projects within the corridor? (Note: Cost-effectiveness to be qualitatively measured in terms of WSDOT funds expended to procure the identified project.)
  - If an individual identified project is implemented in advance of the other identified improvements in the corridor, does it preclude implementation of the other projects?

## 6.2 INTERCHANGE CONCEPTS

The SR 518 corridor contains the following interchanges:

- SR 509
- Des Moines Memorial Drive (DMMD)
- S 154<sup>th</sup> Street (at 24<sup>th</sup> Avenue S)
- Seattle-Tacoma International Airport (North Airport Expressway – NAE)
- SR 99
- 51<sup>st</sup> Avenue S
- I-5/I-405 (Tukwila Interchange)

Potential corridor improvements are organized and evaluated by interchange location. For each interchange location, a discussion of existing conditions, the concepts considered, and the recommended concept is presented.

Screening matrices for each interchange location are presented in Appendix D. these matrices were used to evaluate the identified concepts against the criteria described earlier. Representatives from local municipalities and agencies participated in the Project Advisory Committee during concept development for each interchange area. Their participation was to insure that local needs were addressed and that the proposed actions not conflict with other improvements being planned for the area. A more detailed discussion of the Public Involvement aspect to this study is presented in chapter VII.

## 6.2.1 SR 509 Interchange

The existing interchange of SR 518 with SR 509 (Figure 6.1) can be characterized as a full diamond interchange with an eastbound (EB) to northbound (NB) loop ramp in the southeast quadrant. Direct access from NB to EB, from westbound (WB) to NB, and from EB to NB, is provided by direct freeway-to-freeway ramps. All other movements are accomplished through two signalized intersections. These include the southbound (SB) to EB, EB to SB, and NB to WB movements. Additional, through movements are affected by these signalized intersections, as they are required to stop for crossing traffic.

Figure 6.1  
Existing SR 509 Interchange



The western terminus of SR 518 lies at the ramps to/from SB SR 509, at which point the state route becomes S 148<sup>th</sup> Street, a local principal arterial in the City of Burien. Signals incorporated within the SR 509 interchange are the only signalized intersections on the entire SR 518 mainline, with the remainder of the corridor being a fully access-managed freeway facility.

The interchange provides a primary entrance to the City of Burien, as well as connections to SR 509. Freeway-to-freeway connections will become increasingly important as a number of planned and proposed projects are implemented on connecting facilities. A south extension of the SR 509 corridor to connect with I-5 south of the airport is currently planned for construction starting in 2003/2004. Similarly, improvements being studied for the Alaskan Way Viaduct and East Marginal Way corridors could link the northern end of the SR 509 corridor, at First Avenue South Bridge, directly to downtown Seattle with a fully access-controlled freeway facility. These improved connections to the regional freeway system would increase the

importance of the SR 509 corridor, and in turn place added importance on the SR 518 corridor. The potential need to improve the freeway-to-freeway connections to and from the north, and possibly to and from the south as well, is likely to increase as the SR 509 corridor takes on increasing regional significance.

Under the current configuration, all traffic from SB SR 509 to EB 518 must pass through a signalized intersection at the SB ramp terminus with S 148<sup>th</sup> Street (Figure 6.1, Intersection 2), and then through a second signal at the intersection of SR 518 with the NB ramps (Figure 6.1, Intersection 3). As described in chapter 5, Intersection 2 currently operates at LOS D during both the AM and PM peak hours, but is forecast to degrade to LOS F during the PM peak hour by 2025. Additionally, traffic analysis at the adjacent intersection of 1<sup>st</sup> Avenue S and S 148<sup>th</sup> Street (Figure 6.1, Intersection 1) is forecast to operate at LOS E and F in 2025. The close proximity of these two interchanges compounds the situation by complicating signal operations and causing queuing and blocking problems during peak periods.

Unlike the intersections at 1<sup>st</sup> Avenue S/S 148<sup>th</sup> Street and SR 518/SB ramps, the intersection of SR 518 with the NB ramps (Figure 6.1, Intersection 3) operates at a fairly high level of service,

even at future demand levels (LOS C in 2025). This is due to the fact that the signal only operates two phases; interrupting through movements only to allow left-turns from the NB SR 509 off-ramp to WB SR 518. While future demand is quite high for the through movements at this location (62,000 vehicles per day, both directions total), the forecasted daily left turning (WB to SB) volume is small (1900 vehicles).

Once SR 509 is extended to the south, a new access roadway is anticipated to be constructed to provide access between Sea-Tac Airport and south I-5 (via SR 509). This direct connection into the airport from the south is anticipated to reduce the demand for direct access to and from the south at the SR 509/SR 518 interchange, and is reflected in the forecast volumes presented here. However, options to complete this full freeway-to-freeway connection should be preserved to allow potential expansion of the interchange to accommodate potential demand beyond the 2025 horizon year of the proposed RDP.

### **6.2.1.1 CONCEPTS CONSIDERED**

Four basic concepts for the SR 509 interchange were developed and taken through the screening process. These concepts were:

- **No Action Concept:** Maintain existing configuration, a diamond interchange with an EB to NB loop ramp. The current configuration does not accommodate freeway-to-freeway movements directly. Instead, SR-518 abruptly transitions to an arterial at the interchange, with signalized intersections at the two ramp terminals.
- **Concept 1 - Single Point Urban Interchange (SPUI):** Modify the diamond interchange to a single point urban interchange (SPUI). This would reduce the number of intersections on SR 518 from two to one, and further separate the interchange from the adjacent intersection of 1<sup>st</sup> Avenue S and S 148<sup>th</sup> Street.
- **Concept 2 - Direct Connect Ramps (SB to EB, WB to SB) with Diamond:** Addition of freeway-to-freeway direct connection ramps from SB SR 509 to EB SR 518 and from WB SR 518 to SB SR 509. These would be added in addition to minor modifications to the existing interchange to form a full diamond (replacing the loop ramp with a NB diamond ramp), which would continue to handle local trips to/from Burien.
- **Concept 3 - Direct Connect Ramp (SB to EB) with SPUI:** The SB to EB direct freeway-to-freeway ramps could also be developed around a modified SPUI interchange (rather than the existing diamond), with the SPUI handling local movements.

These four concepts are schematically presented in Figure 6.2.

These concepts were evaluated at a screening-level of analysis, resulting in a hybrid recommended concept. The hybrid concept would provide a direct freeway-to-freeway ramp between SB SR 509 and EB SR 518, completing direct access for the primary SB to EB, and (existing) WB to NB movements. Local trips could be handled by either a modified diamond or SPUI, similar to what was presented in concepts 3 and 4. This concept would be developed so that addition of full freeway-to-freeway connections to the south could be accommodated in the future as well, should such access be needed in the future.

The concept evaluation and screening process is documented in Appendix D.



## **No Action Concept**

### **Concept Description**

The No Action Concept at the SR 509 Interchange maintains the existing interchange configuration. The No Action concept does not alter the existing interchange limits or configuration.

## **Concept 1 - Single Point Urban Interchange (SPUI)**

### **Concept Description**

The SPUI concept at the SR 509 interchange replaces the existing diamond/loop interchange (which utilizes two signalized intersections) with a single signalized intersection that meets at the approximate center of the overpass. Right-turn slip lanes to and from the ramps are maintained or improved, while the SPUI intersection accommodates all left turns.

In addition to consolidating the turning movements to a single location, the SPUI offers the advantage of further separating the interchange's signalized intersection from the arterial intersection at S 148<sup>th</sup> St/1<sup>st</sup> Avenue S in Burien. The increased distance between the intersections would provide improved storage for queuing, reduce the impacts of adjacent intersection operations, and provide better opportunities for Burien to provide a gateway feature at the western terminus of SR 518.

Analysis under forecast volumes indicates a seven-lane section is warranted on the SR 518 mainline through the interchange. Recommended geometry is for three through lanes WB, and two EB. Dual turn lanes would accommodate left turns for all legs of the SPUI (WB to SB, SB to EB, EB to NB, and NB to WB). Receiving ramps would be single-lane for right-turn slip ramps, and dual lane for the central ramps that serve left turns at the SPUI. These dual lane SPUI ramps would begin/end as single lane ramps on SR 509, and taper to/from dual lanes at the SPUI.

Some type of traffic control (stop sign or signal controlled by the SPUI controller) is suggested for the SB to WB ramp, due to its proximity to the 1st Ave S / S 148th St intersection. Alternatively, left turns on EB S 148th Street could be prohibited for traffic coming from the SB to WB ramp, though conflicts with EB traffic on SR 518 would still be experienced under this option.

Due to condensed configuration, SPUI's generally require less right-of-way than traditional diamonds. It is anticipated that it would be possible to construct the proposed SPUI within the existing right-of-way.

## **Concept 2 - Direct Ramps with Diamond**

### **Concept Description**

The Direct Ramps with Diamond concept at the SR 509 interchange involves the addition of two direct freeway-to-freeway ramps serving SB to EB, and WB to SB movements, in addition to the removal of the EB to NB loop ramp (replacing it with a diamond ramp in the northeast quadrant) to accommodate the new SB to EB ramp. *(Note: Maintenance of the existing loop ramp would be a preferred if it could be accommodated within the design of the new flyover ramp. The analysis and screening in this RDP assumed that the ramp would conflict with the new SB to EB flyover ramp, and would need to be relocated to the north as a diamond ramp).*

Review of geometric feasibility found that the SB to EB ramp could be constructed to either pass under SR 518, then turn and fly-over SR 509; or instead could pass under both facilities. Either variation would keep the profile at or below the elevation of the existing facilities at the interchange, minimizing view impacts. The WB to SB ramp is proposed as a fly-over that passes above the other interchange components.

This concept would allow the elimination of the westernmost signalized intersection, since the WB to SB movement would be accommodated via the direct freeway-to-freeway ramps. Existing right-turn slip lanes would be maintained to accommodate WB to NB and EB to SB movements, while EB to NB and NB to WB movements would be accommodated at the remaining (eastern) signalized intersection.

Implementation of this concept would likely require additional right-of-way in all quadrants except the northeast.

### **Concept 3 - Direct Ramp with SPUI**

#### **Concept Description**

This concept would combine the SPUI interchange modifications identified in the first concept with the SB to EB flyover ramp of the second concepts. WB to SB, NB to WB, and EB to NB movements would be accommodated by the SPUI intersection, with SB to EB and WB to SB movements accommodated by the direct connection freeway ramps. The lower volume WB to SB ramp is not included in this concept (the movement is instead handled by the SPUI). This ramp could still be added at a later time, changing the operation of this concept to resemble that of the *Direct Ramps with Diamond* concept.

Similar to the previous concept, additional right-of-way would likely be needed in the all quadrants except the northeast. Forecast volumes could be accommodated by single-lane direct access ramps, while the SPUI configuration would be similar to the first concept, with the exception that the SB to EB ramp would not be necessary.

**Figure 6.2**  
**SR 509 Interchange Concepts**

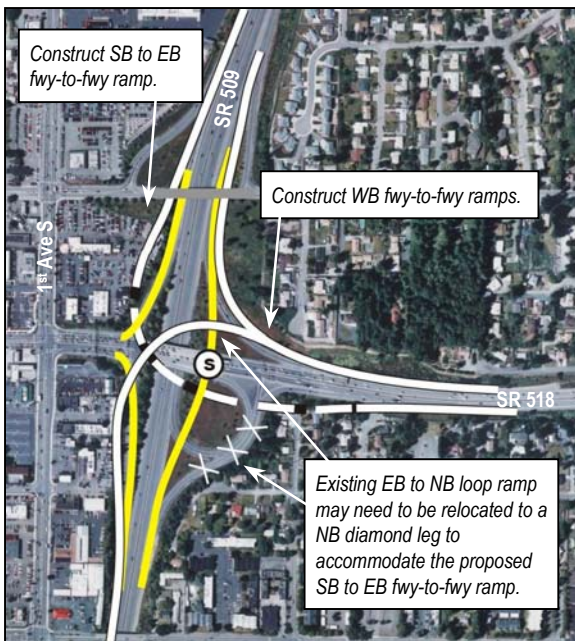
**No Action Concept**



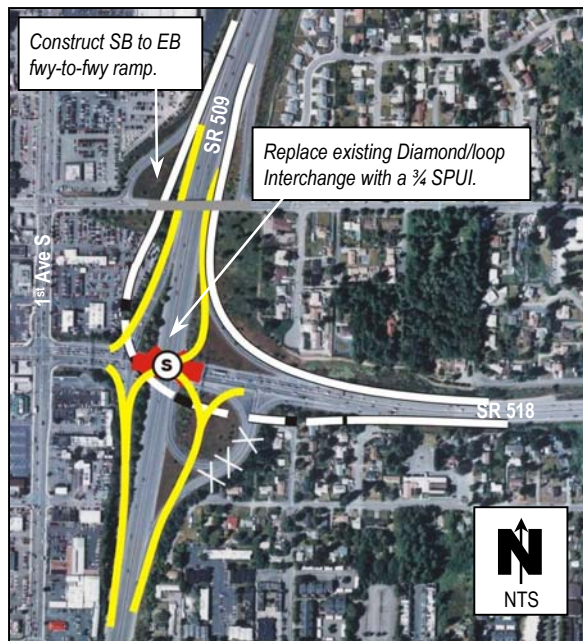
**Concept 1 - SPUI**



**Concept 2 - Diamond with Direct Connect Ramps**



**Concept 3 - SPUI with Direct Connect Ramp**



### **6.2.1.2 RECOMMENDED CONCEPT FOR THE SR 509 INTERCHANGE**

The recommended concept at this location is a hybrid combination of limited access and local connections through a single interchange (See Figure 6-3). The recommended concept would be similar to either concept 2 (without the WB to SB direct access ramp) or concept 3, depending on the local access component implemented.

The primary component of the recommended concept is a freeway-to-freeway ramp to serve the SB SR 509 to EB SR 518 movement, which is the highest volume movement not currently served with direct-access ramps (Currently, this movement passes through two signalized intersections). This new ramp would compliment the existing direct ramp from WB SR 518 to NB SR 509, providing full directional connections to/from the north. Review of geometric feasibility found that the ramp could be constructed to either pass under SR 518, then turn and fly-over SR 509; or instead could pass under both facilities. Either variation would keep the profile at or below the elevation of the existing facilities at the interchange. This would minimize view impacts, as well as preserve the opportunity for an eventual WB to SB freeway-to-freeway direct connection, should such a connection be deemed necessary at some future time.

Under the recommended concept, WB to SB movements would continue to be accommodated by the western signalized intersection. The WB to SB direct freeway-to-freeway ramp is not included in the recommended concept at this time due to the relatively high cost of implementation in relation to the modest volume of traffic forecast for the movement, as well as the additional impacts (visual and property) over continued service by an at-grade intersection. However, the opportunity to provide it as a component to the ultimate build-out of this interchange should be maintained during implementation of other improvements at the interchange.

All other movements (other than the SB to EB), as well as local access to and from Burien, would continue to be provided through and intersections at the terminus of the SR 518 alignment. This access could be improved in either of two ways:

- *A modest reconfiguration of the exiting intersections.* Similar to the NA and concept 2, this would involve maintaining use of the existing overpass and ramp structure, modifying the signalized intersections (since the SB to EB left turn would instead be accommodated by the proposed new ramp, this phase could be removed), and instituting channelization and streetscape elements to reinforce the transition from freeway to arterial. These elements could not be constructed until after the proposed direct SB-EB ramp was implemented.

The advantages for this option are that it would provide good levels of service for the remaining at-grade movements, ranging from LOS B to C, at a low cost (in addition to the cost of the proposed flyover). The largest conflicting turning movement is eliminated by the flyover ramp, and the remaining movements could be adequately accommodated through signalized intersections. The drawbacks to this option are that it provides less queuing and storage space than the SPUI option (described next); the westernmost signalized intersection remains in close proximity to the heavily congested 1<sup>st</sup> Ave S/S 148<sup>th</sup> Street intersection; and conflicting movements at the easternmost intersection would increase if the existing loop ramp were replaced with a diamond ramp (necessitating left turns from EB SR 518) to NB SR 509.

- *Replace existing interchange with a Single Point Urban Interchange (SPUI).* This option would involve replacing the two current intersection with a new SPUI intersection, as described under concept 3. The primary benefits of the SPUI involve intersection placement and spacing, as levels-of-service would be similar to the diamond option described above. The SPUI would offer the additional advantages of increased storage for WB-SB left turns; further distancing the interchange intersection(s) from the heavily congested S 148<sup>th</sup> St/1<sup>st</sup> Ave S intersection in Burien; and consolidation of signalized turns to a single, centralized location. Left turns from EB SR 518 onto NB SR 509 would be accommodated further within the interchange than under the diamond option (assuming the loop ramp is replaced under that option) at a location where vehicle speeds and driver expectations would be better suited for such movements. The disadvantages are that the option is expensive compared to the diamond option, and loses utility if other components are added. For example, if the WB to SB flyover ramp were constructed in the future, the WB to SM leg of the SPUI would become obsolete, and the SPUI would essentially function similarly to the diamond option, though it would have been implemented at a much higher cost.

The SPUI component could be phased (constructed either ahead of or after the proposed direct SB-EB ramp), though if it were constructed afterward, the SB-EB leg of the SPUI could be omitted.

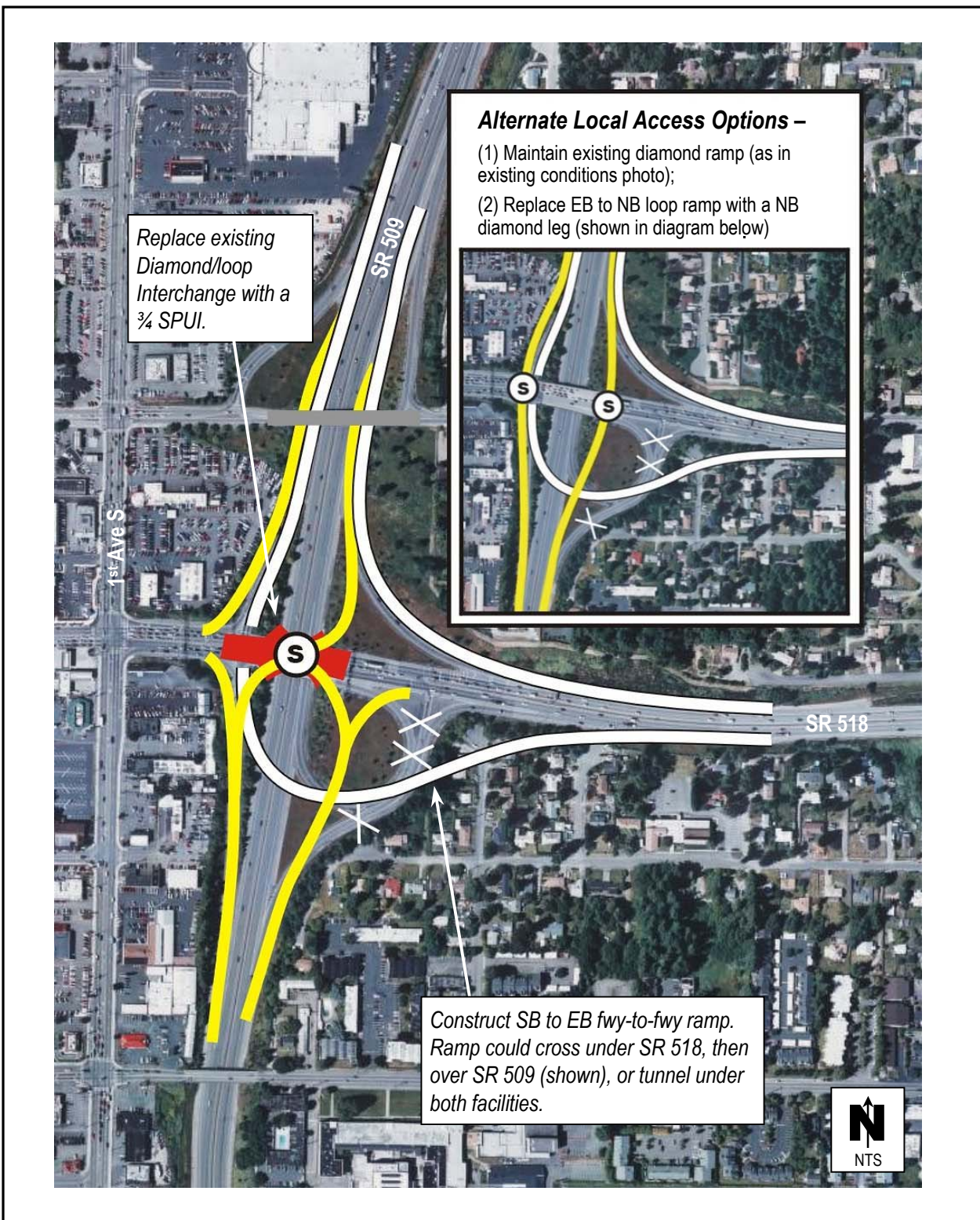
Realization of the proposed hybrid would require:

- Initiation of an environmental analysis and design process for the interchange, including the need for an access decision report as required by the WSDOT.
- If the option to construct a SPUI interchange were selected as part of the overall interchange concept, with a single intersection on SR 518 serving crossing ramp movements, minor realignment of all ramps leading to the interchange would be required. *Note: No SB-to-EB ramp would be required on the SPUI if it is constructed concurrent with or after the proposed flyover ramp that serves the same movement.*
- Construction of a direct-connection ramp from SB SR 509 to EB SR 518 completing the freeway-to-freeway access couplet to and from the north. The likely alignment for this ramp would be to cross under SR 518, and then climb and cross over SR 509, connecting to EB SR 518. Alternatively, this ramp could be constructed to fly-under both roadways. Either option could be concealed from existing sight lines in the City of Burien by using the grades on SR 509 advantageously.
- Potential modification of signal operations at S 148<sup>th</sup> Street and along 1<sup>st</sup> Avenue S to better accommodate access to Burien from SB SR 509.

The recommended concept should be designed and constructed so that a gateway concept, as proposed by the City of Burien, can be accommodated.



**Figure 6.3**  
**Recommended Concept for the SR 509 Interchange**





### **Impacts of the Proposed Action**

The recommended concept is expected to improve operations and safety at all of the three existing HAL's at this interchange. Left-turning movements, which currently impede high volumes of through-traffic (west to south and south to east), would be reduced. The south to east movement would be completely removed from intersection operations, instead using a fully grade-separated freeway-to-freeway ramp. With the SPUI component, the remaining at-grade turning movements would all be controlled at a single intersection (reducing conflict points). Additionally, WB to SB turns, which currently occur during a protected/permissive phase, would now occur during a protected phase only. The final HAL in this location occurs during the west to north movement. The majority of these incidents involved fixed object and overturns, indicative of excessive speeds. Realignment of this ramp would provide an opportunity to avoid problem spots, and/or to include signage, rumble strips, or other speed control measures.

Impacts to freight mobility would also be expected to be positive. Freight connections both to and through the corridor would be improved by the streamlined interchange and direct connection ramps. The number of signalized intersections would be reduced by one for some movements and reduced by two for others. The proposed configuration would present a less complicated interchange and set of decisions points for a driver. Improvements that would benefit operations and safety would also benefit freight mobility, travel time savings, and costs.

### **6.2.2 Des Moines Memorial Drive Interchange**

Des Moines Memorial Drive (DMMD) intersects SR 518 at milepost 0.60. Access is currently provided to EB SR 518 and from WB SR 518 only, resulting in a half-diamond interchange (Figure 6.4). The interchange currently serves adjacent residential and commercial land uses. Immediately to the east of the interchange, on both the north and south sides of SR 518, environmentally sensitive wetland habitat exists, interconnected with systems related to Lake Reba.

The entire existing interchange, and all potential improvements that might be proposed at this site, would lie within the FAA's Controlled Activity Area (CAA). CAA zones are established at the ends of airfield runways to reduce the risk of air accidents related to ground objects. Construction of new facilities and certain developments are allowed within the CAA Zone, but any such activity requires concurrence by the FAA prior to implementation.

Figure 6.4  
Existing DMMD Interchange



Interest in improved access at either the DMMD interchange or the 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street interchange has been expressed by the Port of Seattle as well as community members to improve access to/from the west for proposed commercial and airport-related activities

(proposed north of SR 518, between DMMD and 24<sup>th</sup> Avenue S). WB traffic from the surrounding neighborhoods currently uses either DMMD or S 146<sup>th</sup> Street (via S 144<sup>th</sup> Street) to access the SR 509 corridor in Burien. Improved access at either the DMMD or 24<sup>th</sup> Avenue S interchanges could improve connectivity of this community to the freeway network.

Traffic operations are currently acceptable for the movements provided through the existing interchange (LOS A to LOS B for the ramps, LOS C to D mainline). By 2025, these same movements are anticipated to still operate at acceptable levels for the movements allowed through the interchange (LOS B for the ramps, and LOS B to D for adjacent mainline segments). The ramp termini intersections will operate at LOS C or better during peak periods, assuming signalization of the intersection of DMMD with the WB SR 518 off-ramp, as identified in the City of SeaTac Six-Year Transportation Improvement Plan.

Completion of this interchange to provide fully directional access to SR 518 could substantially change the travel patterns in this portion of the corridor, bringing heavier truck traffic and commercial-oriented travel into an area that is primarily residential. Furthermore, completion of the interchange could be argued to congregate activity (i.e., vehicle traffic) within the CAA. Such improvements would require negotiation with the FAA to achieve implementation. Alternate locations for providing expanded access would be preferred.

#### **6.2.2.1 CONCEPTS CONSIDERED**

Four interchange concepts were developed for the DMMD interchange. They include:

- **No Action:** Maintain existing configuration, a half diamond interchange with access to and from the east.
- **Concept 1 - Interchange Removal:** Complete removal of the existing interchange.
- **Concept 2 - Full Access (Diamond):** Provide full access by constructing ramps to and from the west to complete a full diamond interchange.
- **Concept 3 - Full Access (Loop Ramp):** Provide full access by constructing a  $\frac{3}{4}$  diamond with a NB to EB loop ramp in the northwest quadrant.

These four concepts are schematically presented in Figure 6.5.

These concepts were evaluated at a screening-level of analysis, which is presented in Appendix D. Advantages and disadvantages that could result from implementation were considered. Maintaining the existing interchange configuration at the interchange (i.e., the No Action concept) is recommended for inclusion in the Route Development Plan. In recommending this alternative for the Des Moines Memorial Drive interchange, it is proposed that identified access needs can be accommodated through modifications proposed to the 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street interchange.

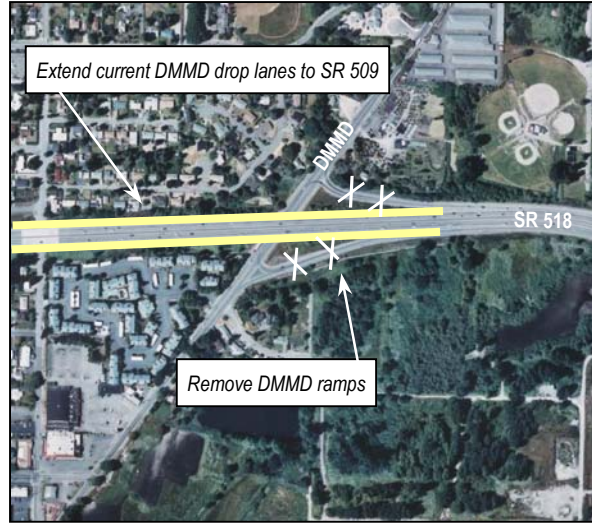
Analysis results from the screening process resulting in the above recommendation are presented in Appendix D.

**Figure 6.5**  
**DMMD Interchange Concepts**

**No Action Concept**



**Concept 1 - Interchange Removal**



**Concept 2 - Full Access Diamond**



**Concept 3 - Full Access w/Partial Cloverleaf**



## **No Action Concept**

### **Concept Description**

The No Action Concept at the SR 509 Interchange maintains the existing interchange configuration and limits.

## **Concept 1 - Interchange Removal**

### **Concept Description**

The Interchange Removal Concept at the DMMD Interchange involves the removal of the existing EB on-ramp and WB off-ramp. Local traffic would instead access the regional freeway system via adjacent interchanges in Burien (on SR 509) or in SeaTac (on SR 518 at SR-99). The existing 3-lane freeway mainline east of the interchange would need to be extended west to SR 509 if the DMMD ramps were removed, since these lanes currently drop at the DMMD ramps.

A new frontage road system was also considered during development of this concept, in order to provide easier access to the 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street interchange. This aspect of the concept was dropped, however, due to abutting environmental and built constraints on each side of SR 518, CAA requirements, and a concern that a frontage road would be too indirect to provide an operational advantage.

## **Concept 2 - Full Access (Diamond)**

### **Concept Description**

The Full Access (Diamond) concept at the DMMD Interchange involves improving the existing half diamond interchange by adding ramps in the northwest and southwest quadrants to complete a full diamond interchange. Construction of the Full Access concept would require new right-of-way in the northwest and southwest quadrants.

The benefit of this concept is primarily limited to providing full access in all directions, rather than just partial access to/from the east, for local trips. Improved operations on either the mainline or DMMD itself would not be expected. Additionally, demand is forecast to be modest, even with full access. Numerous impediments to implementation of this concept would be expected. The concept right-of-way requirements would impact existing residential land uses, environmentally sensitive areas, and unstable, steep slopes. Additionally, the new ramp merge/diverge areas to the west of DMMD would interfere with ramp operations at SR 509 (both physically and in terms of traffic operations). Finally, the entire interchange lies within the FAA's CAA zone, which would complicate implementation further due to restrictions on development within the zone.

## **Concept 3 - Full Access (Loop Ramp)**

### **Concept Description**

The Full Access (Loop Ramp) concept at the DMMD Interchange also completes full access to SR 518, but utilizing a loop ramp in the northeast quadrant to provide NB to WB access. This variation to the previous concept was developed in an attempt to minimize impacts to existing land uses to the northwest of the interchange, as well as provide additional separation from the

SR 509 interchange. Other benefits and impacts are similar to concept 2. Construction of the Full Access concept would require new right-of-way in the northeast and southwest quadrants.

#### **6.2.2.2 RECOMMENDED CONCEPT FOR THE DMMD INTERCHANGE**

Based on the projected modest demand characteristics of the Des Moines Memorial Drive interchange anticipated in the year 2025, the environmental constraints in the immediate vicinity, and the potential secondary impacts of improvements at the interchange, the No Action concept is recommended for inclusion in the RDP (See Figure 6-6). Selection of this concept does not limit the ability to improve access at this location in the future, should demand increase beyond that anticipated by the 2025 RDP design year. Furthermore, recommendation of the No Action concept for the DMMD interchange as part of the RDP recognizes that improved access can be achieved at the 24<sup>th</sup> Avenue S interchange, which is an area of fewer constraints and greater transportation demand.

Improved connectivity to other arterials and interchanges through development of roadway networks parallel to SR 518 would help offset the lack of full access at DMMD, and improve circulation in the vicinity of the interchange. In particular, improved arterial access between DMMD and Burien south of the SR 518 mainline, and between DMMD and 24<sup>th</sup> Avenue S north of SR 518, would provide beneficial local connections and improve circulation. Furthermore, the need for increased management of intersection control should be monitored by the State and cities of SeaTac and Burien for indication of mitigation warrants.

#### **Impacts of the Proposed Action**

Expected traffic operations, safety, and freight mobility would not be altered under the recommended No Action concept.

#### **6.2.3 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street/Airport/SR 99 Interchange Area**

The central portion of the SR-518 corridor consists of a complex series of closely spaced partial interchanges at SR 99, S 154<sup>th</sup> Street, and the North Airport Expressway (NAE). These interchanges, which are viewed as comprising a single, unified interchange complex in this RDP, are shown in Figure 6.7. The SR-99 interchange provides access to/from the east, while the S 154<sup>th</sup> Street ramps provide access to and from the west. The NAE, a full interchange, is located between the two partial interchanges at SR 99 and S 154<sup>th</sup> Street. The total length of the interchange complex is approximately one mile.

In the WB direction, the SR 99 and the NAE utilize a combined offramp, which splits to provide access SB to the airport, and to SR 99 – SB via a loop ramp and NB indirectly via S 154<sup>th</sup> Street. The WB onramps from NAE and S 154<sup>th</sup> Street merge with the mainline west of the 24<sup>th</sup> Avenue overpass. In the EB direction, the offramp to S 154<sup>th</sup> Street meet the arterial just east of 24<sup>th</sup> Avenue S; followed by the separate offramp to the NAE. East of SR 99, the NAE and SR 99 onramps join the mainline in close proximity to one another; each merging into the two mainline lanes immediately.



**Figure 6.6**  
**Recommended Concept for the DMMD Interchange**

***No Action Concept Recommended***– No changes at the DMMD Interchange Proposed. Arterial improvements and adjacent interchange improvements recommended instead.





**Figure 6.7**  
**Existing S 154<sup>th</sup> Street/Airport/SR 99 Interchange**



The interchange complex has several operational and capacity related problems. The SR 518 ramps at SR 99 provide only partial, indirect access between two regional highway facilities. Even so, travel demand is very high, resulting in LOS D/E in 1998, and LOS F at both SR 99 ramps by 2025. Furthermore, the indirect routing of traffic to NB SR 99 from WB SR 518 (via S 154<sup>th</sup> Street and a left turn onto SR 99) compounds congestion at the intersection of SR 99 and S 154<sup>th</sup> Street by significantly increasing left turns in the EB direction. Overall, access to the major north-south arterials in the area is indirect.

The close proximity of the interchange ramps adversely affect traffic operations on the SR 518 mainline as well. This is particularly true in the EB direction, where the NAE and SR 99 onramps enter the freeway in close succession.

### **6.2.3.1 CONCEPTS CONSIDERED**

A wide range of initial concepts were developed for this interchange area in an effort to improve traffic circulation, minimize traffic and environmental impacts (arterial and freeway), and increase accessibility to surrounding land uses. This set of initial concepts was reviewed to gauge feasibility and potential constraints, traffic characteristics, and geometric considerations (including interchange spacing and added access). A refined set of concepts were developed that generally involved relocating the S 154<sup>th</sup> St ramps to 24<sup>th</sup> Ave S, reconfiguring the SR 99 ramps, and providing full access through frontage road connections between the sets of ramps. They include:

- **No Action:** Maintain existing configuration.
- **Concept 1 - Split Diamond:** A split diamond interchange would provide full access through ramps to/from the west at 24<sup>th</sup> Ave S, and to/from the east at SR-99. One-way frontage roads would connect the two half interchanges.
- **Concept 2 - Combined SPUI and Half Diamond:** A full SPUI interchange at SR-99, and a half diamond interchange at 24<sup>th</sup> Ave S. Connecting ramps eliminate the need for added access directly to the mainline between 24<sup>th</sup> Ave S and SR-99. The EB merge of the onramp from 24<sup>th</sup> Ave S onto the NAE is problematic in terms of geometry, and requires that a third EB lane be constructed on SR-518.
- **Concept 3 - Split Diamond with Loop Ramp:** A combination split diamond interchange with a loop ramp at SR-99 would provide full access through ramps to/from the west at 24<sup>th</sup> Ave S, and to/from the east at SR-99. Frontage roads would connect the two half interchanges. The loop ramp from WB SR-518 to SB SR-99 would eliminate the need for an additional signal on SR-99.

These concepts are schematically presented in Figure 6.8.

These concepts were evaluated at a screening-level of analysis. This evaluation resulted in the recommendation that two variations, the Combined SPUI and Half Diamond, and the Split Diamond with Loop Ramp concepts, be continued forward for further, subsequent study. Analysis results from the screening process resulting in the above recommendation are presented in Appendix D.

## **No Action Concept**

### **Concept Description**

The No Action concept at the S 154<sup>th</sup>/Airport/SR 99 interchanges does not alter the existing interchange configuration or limits.

## **Concept 1 - Split Diamond**

### **Concept Description**

The Split Diamond concept creates full access at SR 99 and 24<sup>th</sup> Avenue S by implementing a half set of ramps to/from the east at SR 99, and a half set of ramps to/from the west at 24<sup>th</sup> Ave S (replacing the current S 154<sup>th</sup> Street ramps). One-way frontage roads would connect the two half interchanges to provide full access from each direction.

Construction of the Split Diamond concept would require new right-of-way on the north side of SR 518, including properties that are currently developed with single and multi-family housing. Ramps at 24<sup>th</sup> Avenue S may also require some additional right-of-way, though the affected land is undeveloped. Ramp merge and diverge points would be single lane ramps, with additional pockets at the terminal intersections.

The split diamond represents a fairly simply (geometrically) interchange layout that would accommodate full access in the central section of the corridor. Traffic analysis under volumes forecast for 2025 indicated that the configuration would operate at acceptable levels-of-service, but that queue storage would be problematic. Further review, including simulation in SimTraffic should significant blocking impacts on SR 99 under this concept. This analysis is detailed in Appendix E.

## **Concept 2 - Combined SPUI and Half Diamond**

### **Concept Description**

This concept combines a full SPUI interchange at SR-99, and a half diamond interchange at 24<sup>th</sup> Ave S. Connecting ramps eliminate the need for added access directly to the mainline between 24<sup>th</sup> Ave S and SR-99. The EB merge of the onramp from 24<sup>th</sup> Ave S onto the NAE is problematic in terms of geometry, and requires that a third EB lane be constructed on SR-518. However, the EB connecting ramp could be phased and constructed at a later time than the rest of the interchange. EB traffic from 24<sup>th</sup> Avenue south would have to use S 154<sup>th</sup> Street and the SPUI interchange intersection instead.

Construction of the Combined SPUI and Half Diamond concept would have similar limits to the other build concepts. It would require new right-of-way on the north side of SR 518, including properties that are currently developed with single and multi-family housing. Ramps at 24<sup>th</sup> Avenue S may also require some additional right-of-way, though the affected land is undeveloped. Ramp merge and diverge points would be single lane ramps, with additional pockets at the terminal intersections.

This concept operates at acceptable levels of service also. Traffic analysis conducted at the RDP level indicates that significant delays could be expected at the SPUI intersection, though the intersection has much better capability to handle the queue lengths projected than does Concept 1.



**Figure 6.8**  
**24<sup>th</sup> Avenue S/Airport/SR 99 Interchange Concepts**

### Concept 1 - Split Diamond

Features:

- Ramps to/from the east at SR-99.
- Ramps to/from the west at 24<sup>th</sup> Ave S.
- One-way frontage roads connecting 24<sup>th</sup> Ave S and SR-99.
- Ramp terminal intersections at SR-99 and 24<sup>th</sup> Ave S are signalized.



### Concept 2 - Phased Combined Diamond/SPUI

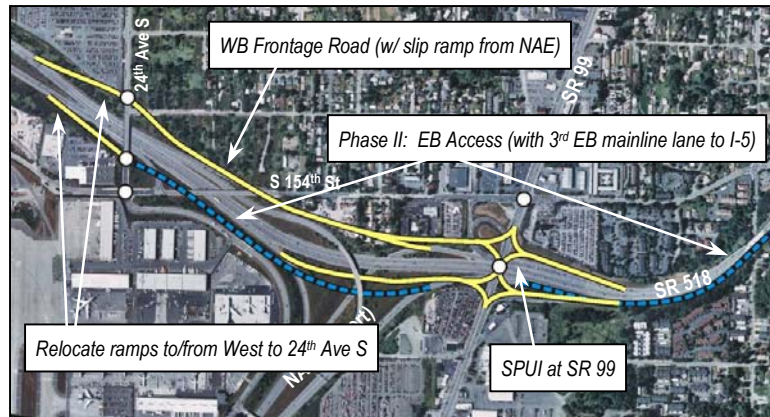
Features:

*Phase I*

- Full SPUI at SR-99.
- Partial 24<sup>th</sup> Ave S Interchange.

*Optional Phase II*

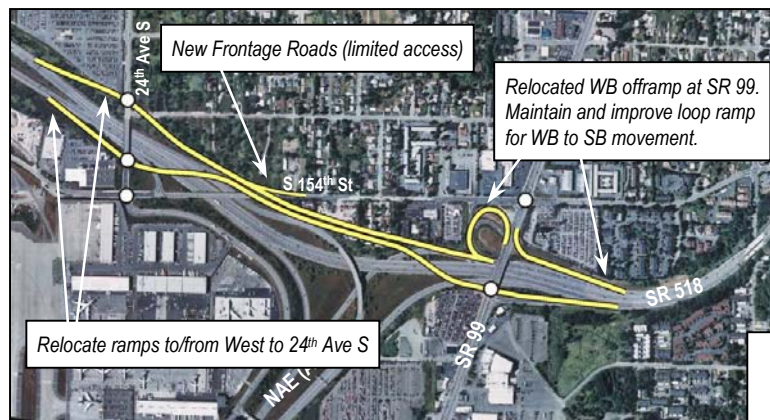
- Complete 24<sup>th</sup> Ave S Interchange concurrent with, or after, 3<sup>rd</sup> eastbound lane on SR 518.



### Concept 3 - Modified Split Diamond/Loop

Features:

- WB ramp from SR-518 to NB SR-99.
- WB ramp that diverges from NAE offramp to SB SR-99 (via loop ramp) and 24<sup>th</sup> Ave S (via frontage road).
- Frontage roads connecting ramps at 24<sup>th</sup> Ave S and SR-99.
- Slip ramp from 154<sup>th</sup> Ave S to WB frontage road for WB traffic from SR-99.
- Ramp terminal intersections at SR-99 (EB ramp only) and 24<sup>th</sup> Ave S are signalized.



### **Concept 3 - Split Diamond with Loop Ramp**

#### **Concept Description**

This option involves a combination split diamond interchange at SR 99 (to/from the east) and 24th Ave S (to/from the west). The existing loop ramp serving WB to SB movements at SR-99 would be maintained (though improved) to eliminate the need for a new signalized intersection in close proximity to the SR-99/S 154th St intersection. Frontage roads would connect the two half interchanges. NB traffic on SR-99 destined for WB SR 518 would need to use S 154th Street to access a slip ramp onto the new interchange system.

Construction of the Split Diamond with Loop Ramp concept would have similar limits to the other build concepts. It would require new right-of-way on the north side of SR 518, including properties that are currently developed with single and multi-family housing. Ramps at 24<sup>th</sup> Avenue S may also require some additional right-of-way, though the affected land is undeveloped.

Initial traffic analysis at the RDP-level on this concept showed improved delay performance over concepts 1 and 2, but at the expense of instead providing less direct access at SR 99.

#### **6.2.3.2 RECOMMENDED CONCEPT FOR THE 24<sup>TH</sup> AVENUE S - SR 99 INTERCHANGE**

The RDP recommends that both concept 2 (Combined SPUI and Half Diamond) and concept 3 (Split Diamond with Loop Ramp) move forward for further, more detailed evaluation during the environmental assessment process. These two concepts both rated similarly in the screening process documented in Appendix D, and appear to both meet operational needs. Given the evolving plans and needs in the vicinity of this interchange (particularly with respect to airport facilities), further analysis and consideration is warranted. These two concepts are shown Figure 6.9.

#### **Impacts of the Proposed Action**

Impacts of the proposed actions will be evaluated further in subsequent study of the 24<sup>th</sup> Ave S – SR 99 Interchange area concepts as part of an Environmental Assessment (EA). In general, either concept would result in more direct routing compared to the existing interchange configuration, and therefore fewer vehicle conflicts would be anticipated. On the west end of the interchange, a standard half diamond interchange on 24<sup>th</sup> Ave S would replace the unconventional set of ramps current in place on S 154<sup>th</sup> Street. At SR-99, the circuitous routing currently required for trips destined to NB SR 99 would be eliminated and replaced by a right turn (to NB SR 99) off of a new, direct ramp from EB SR 518. Either concept would also improve the diverge area on WB SR 518, which currently accommodates NAE and SR 99 traffic through a single diverge lane. Under either concept, operations at this location would be enhanced by better segregating traffic (separating NB SR 99 traffic from airport traffic), as well as establishing a drop lane at either the NAE or SR 99 ramp. In the EB direction, the short merge area from SR 99 could be improved to allow a better transition to the mainline. The addition improvement of adding a third EB lane (proposed under the Tukwila interchange improvements, as well as here under phase II of concept 2), would allow an add lane, rather than the existing merge lane, and substantially decrease conflicting movements at that location.

Impacts to freight mobility would be positive under either concept. Both concepts provide improved access between Sea-Tac airport (and related facilities) and the SR 518 corridor by connecting the 24<sup>th</sup> Avenue and SR-99 corridors, and providing full access to SR 519 utilizing those new frontage road connections. The commercial areas of SeaTac would also benefit from improved access to the regional freeway system.

## **6.2.4 Tukwila Interchange**

The existing Tukwila interchange links three primary freeways: I-5, I-405, and SR 518. The interchange is a full freeway-to-freeway interchange, but some movements are handled with less than desirable ramp configurations for an interchange of this significance, including left-hand exits and entrances. The existing configuration is presented in Figure 6.10.

High occupancy vehicle lanes on I-5 have been retrofitted through the Tukwila Interchange. Direct freeway-to-freeway connections are provided between the I-5 HOV and I-405 HOV lanes for the SB to EB and WB to NB movements. No direct HOV connections are currently provided between I-5 and SR 518.

SR 518 approaches the Tukwila Interchange from the west with two general-purpose (GP) EB lanes. A left-hand diverge exit to I-5 north from EB SR 518 is provided, followed closely by a right-hand diverge ramp to I-5 south. Just east of the SB I-5 exit, the SR 518 EB cross-section necks down to a single lane. Immediately east of this merge from two to one lane, SR 518 ends and the freeway alignment is officially designated as I-405 as it passes underneath the I-5 SB lanes. The single EB lane continues, passing under the I-5 structure, and joining with two left-hand add-lanes from SB I-5 (one GP and one HOV lane), and then joining with one merge lane from NB I-5 further east. At this point the EB configuration consists of a three-lane cross-section (two GP and one HOV lane). Approximately 2/3 of a mile east, a right-hand add-lane ramp enters the I-405 alignment at Andover Park W, providing four I-405 EB through lanes to the SR 181 interchange.

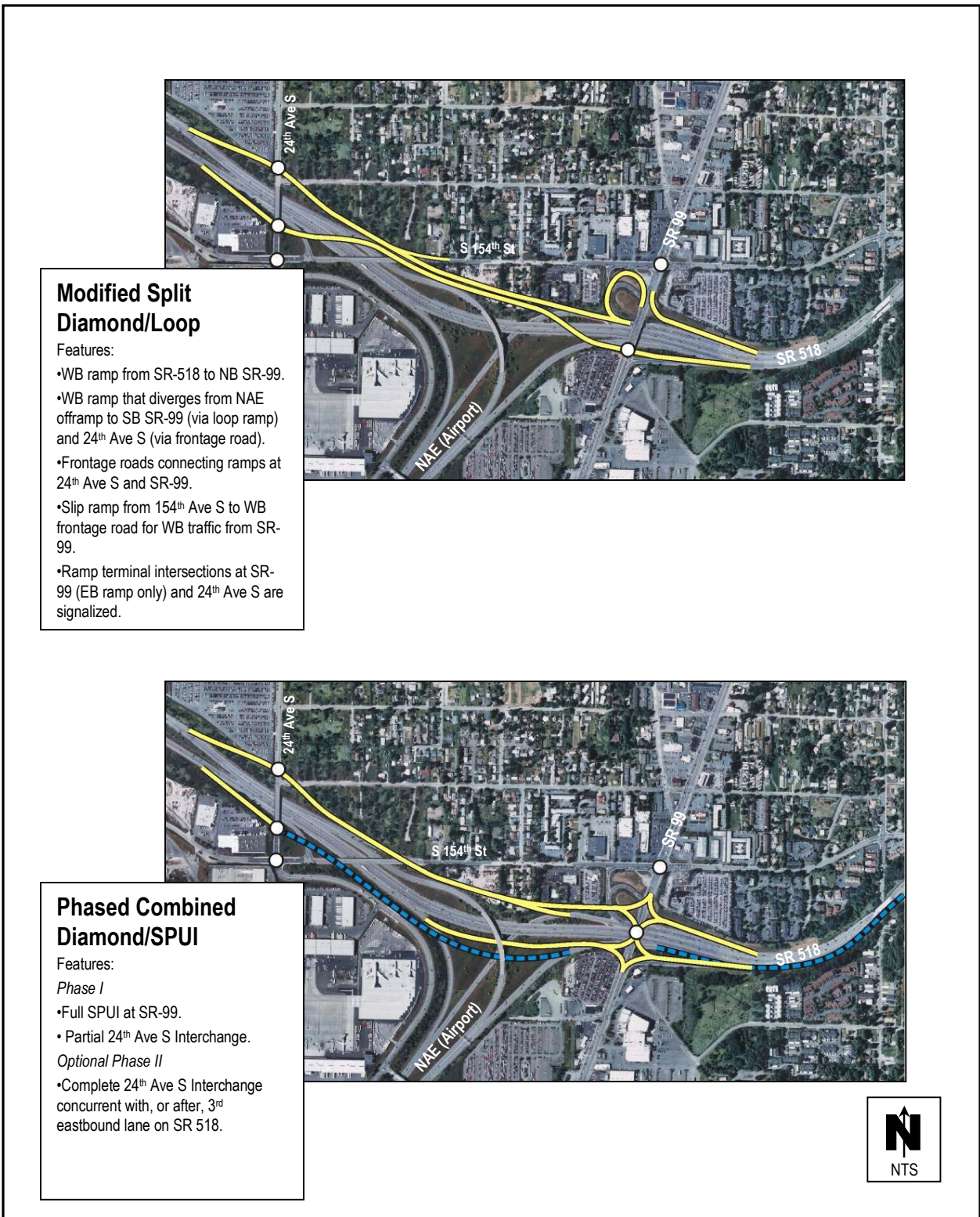
In the WB direction, I-405 enters the Tukwila Interchange with three lanes (two GP and one HOV). The I-405 HOV lane drops from the left-hand side and connects directly to the I-5 NB HOV lane via an underpass. A right-hand side ramp to Southcenter Boulevard and NB I-5 is followed by a left-hand merge from NB I-5 as they continue west over the I-5 lanes. The I-405 designation ends, and SR 518 begins, at the crossing over the SB I-5 lanes. Just to the west of the overcrossing, a WB to I-5 SB loop ramp diverges from SR 518. The two GP lanes are then joined by an add-lane from I-5 SB followed closely by an on-ramp merge from 51<sup>st</sup> Avenue S. Three lanes continue up the hill to the SR 99 and Airport interchanges.

### **EB OPERATIONS**

EB SR 518 currently operates at LOS E during both peaks, with LOS at ramp junctions of E/F (AM/PM) at 51<sup>st</sup> Avenue S, D/D at NB I-5 off, and C/C at SB I-5 off. Operations are forecasted to degrade significantly by 2025 to F/F for the mainline (with a peak V/C approaching 1.30 during the PM), F/F at 51<sup>st</sup> Avenue S off, F/F at NB I-5 off, and B/D at SB I-5 off. Additionally, several other factors (which are not fully captured in



**Figure 6.9**  
**Recommended Concepts for the 24<sup>th</sup> Ave S - SR 99 Interchange**





**Figure 6.10**  
**Existing Tukwila Interchange**



standard LOS analysis) exacerbate congestion levels and operational problems. These include the reduction of the EB SR 518 corridor from two lanes to one lane as it passes under the I-5 alignment; the left-hand exit to NB I-5 which generates a weaving operation that further congests the corridor; interaction with traffic from I-5 that merges with I-405 immediately to the east of the interchange; and the curvature of the roadway prior to the interchange, which makes lane changes difficult.

The left hand exit to I-5 is particularly problematic. Approximately 65% of the peak hour, and 80% of daily ramp traffic, originates at SeaTac airport, entering the roadway on the right under extremely heavy traffic conditions. This traffic is required to work to the left side of the roadway to reach the NB I-5 exit 0.9 miles downstream, a maneuver that is made difficult by heavy traffic volumes, a roadway with both horizontal and vertical curvature, and an observed unbalanced use of existing travel lanes (higher volumes and lower speeds in the right-hand lane). Contributing factors to the unbalanced lane usage include driver anticipation of the left-lane drop, and heavy volumes destined for the 51<sup>st</sup> Avenue S and SB I-5 offramps. Combined, these movements account for 70% of the traffic stream, all of which must be accommodated by the right lane due to the merge of two lanes into a single mainline lane. Observation of current traffic conditions indicates that this operational situation has impacts as far upstream as the Airport onramp. Traffic simulation confirms formation of congestion on the mainline well in advance of the interchange ramps.

The aforementioned drop lane results in a single lane mainline continuing through the interchange. Existing and forecast volumes are moderate (40,000 vehicles per day) and are within the capacity of a single lane, but operational consequences on upstream segments are a concern as outlined above. Additionally, merges with downstream onramps force 3100 vehicles per hour into the rightmost lane under current conditions, resulting in significantly over capacity conditions (V/C 1.35). Increasing demand is forecasted to drive the V/C ratio over 1.40 by 2025.

## **WB OPERATIONS**

WB traffic through the Tukwila interchange experiences congested conditions as well, but at less severe levels than EB traffic. Existing LOS on the mainline is E during both the AM and PM peak periods. Ramp junctions are also congested, as the north to west ramp operates at LOS D/F (AM/PM); west to south loop operates at LOS D/F; and both the south to west and the 51<sup>st</sup> Avenue S onramps operate at LOS D to E in the AM, and E in the PM.

Traffic patterns on WB SR 518 are forecasted to change somewhat by 2025, particularly during the AM peak period, due to travel shifts resulting from the completion of the SR 509 extension and south airport access. LOS on the mainline is forecasted at C to D during the AM peak, and LOS E to F during the PM peak. Peak V/C is forecasted to be 1.04 on the mainline. Ramp junctions are also generally forecasted to change slightly. The north to west ramp is projected to operate at LOS D/F (AM/PM); the west to south loop at LOS E/F; the south to west ramp at LOS F/E; and the 51<sup>st</sup> Avenue S onramp at LOS C in the AM, and F in the PM.

### **6.2.4.1 CONCEPTS CONSIDERED**

Five interchange concepts were developed for the Tukwila interchange area. They include:

- **No Action Concept:** Maintain existing configuration.
- **Concept 1 - Continuation of 2<sup>nd</sup> EB Lane:** Extend a second EB lane through the interchange, where the mainline currently necks down to a single lane.

- **Concept 2 - Right-Side Ramp:** Convert the left-side exit to NB I-5 to a right-side exit. This concept could either create a single right side exit to I-5 north and south, or maintain the existing SB I-5 exit and construct a new I-5 NB exit prior.
- **Concept 3 - New 3<sup>rd</sup> Lane:** Addition of a third lane on the SR 518 EB alignment between the Airport and Tukwila interchanges.
- **Concept 4 - Two-Lane Ramps:** Addition ramp lanes to better accommodate demand and coordinate lane-balancing needs as envisioned under the I-405 corridor improvements.

These five concepts are schematically presented in Figure 6.11.

For purposes of the RDP, a hybrid solution consisting of the above four build concepts is recommended. The hybrid includes the addition of a 2<sup>nd</sup> lane on SR 518 EB through the Tukwila Interchange, conversion of the existing left-side exit to NB I-5 to a right-side exit, and the addition of a third lane on EB SR 518 between the Airport and new right-side exit to I-5. The existing left-side exit should be considered for HOV direct access to the I-5 NB HOV lanes (with a very high occupancy requirement applied). In addition, the WB to SB ramp should be expanded to two lanes to balance lanes coming into the corridor from I-405, and the NB I-5 to EB I-405 ramp should be converted to an add lane during implementation of the proposed I-405 corridor improvements to provide lane balance and accommodate demand.

Analysis results from the screening process are presented in Appendix D.

## **No Action Concept**

### **Concept Description**

The No Action Concept at the Tukwila Interchange maintains the existing interchange configuration and interchange limits.

## **Concept 1 - Continuation of 2<sup>nd</sup> EB Lane**

### **Concept Description**

This concept involves a continuation of the inside EB lane through the I-5 interchange. This additional lane would continue through to the EB on-ramp from Andover Park W, where it would join the existing add-lane (changing the current add-lane to a merge ramp). This would maintain lane-balance, while not significantly impacting operations on I-405 (since the current add lane at Andover Park W carries light traffic volumes).

The current design of SR 518 through the Tukwila interchange forces a merge of the two lane cross-section into a single lane on the right side of the roadway just east of the offramp to NB I-5. This one-lane portion of the alignment has full shoulders (or greater) on both the inside and outside of the single lane. On the east side of the interchange, two lanes from I-5 SB (one GP and one HOV) join the alignment as add-lanes on the left of the single-lane mainline. This juncture is immediately followed by a right-side GP merge from the I-5 NB entrance ramp. The resulting cross-section is two GP lanes plus one left-side HOV lane. Operationally, two GP ramps are forced into a single lane (one from I-5 NB, one from SR 518 EB). This situation forces 3100 vehicles per hour into the rightmost lane under current conditions, resulting in significantly overcapacity conditions (V/C 1.35). Increasing demand will drive the V/C ratio over 1.40 by 2025.

The extension of this second lane from SR 518 is envisioned as a temporary improvement, in advance of capacity improvements proposed as part of the I-405 corridor project. As such, the extension is proposed to be accomplished by converting the shoulders (and shifting lanes to create a smooth transition and maintain at least one shoulder) of SR 518 to the second lane through the interchange. At the merge point between I-405 and the entrance ramp from I-5 NB, the existing lanes plus the new add lane would be shifted to the north, making use of the I-405 inside shoulder. At Andover Park, the I-405 alignment would again assume the existing configuration, since this is the location of the existing add lane. This proposal essentially shifts the add lane back to the point where SR 518 currently narrows down to a single lane. The extended add-lane would be dropped at SR 181 as it is today.

Extension of the second lane from SR 518 would require a total construction length of approximately 3300 feet (or roughly 2/3 of a mile). The extension would also require a variance of Federal Highway Administration (FHWA) and WSDOT design standards for the shoulder conversion to a driving lane for that segment. It would require a Biological Assessment and SEPA/NEPA checklist due to the potential impacts to the portions of Gilliam Creek immediately adjacent to the proposed construction site. However, it is likely that any impacts to the surrounding natural resources would be minimal and could be addressed through the I-405 corridor improvements.

## **Concept 2 - Right-Side Ramp**

### **Concept Description**

The right-side ramp concept at this interchange involves reconstruction of the EB to NB ramp on the right-hand of the freeway. The existing left side ramp could be considered for continued use by HOV's or transit vehicles.

The current left-side exit is problematic because a large percentage of the traffic entering the SR 518 EB corridor upstream at the Airport/SR 99 interchanges is destined for I-5 NB. The current configuration impacts traffic operations by creating an extended weaving area; heavy volumes of traffic enter on the right and must move to the left lane prior to the I-5 exit. These vehicle conflict with through traffic on the SR-518 mainline, who must move from the left lane to the right lane due to the one-lane restriction described under concept 1. Moving the EB to NB ramp to the right side of SR 518 would consolidate access to I-5 to one side of the freeway, and greatly reduce weaving on the SR-518 mainline. This could be accomplished in one of two ways:

- Construction of a single two-lane ramp that would divide to I-5 north and to I-5 south. Such a design would require a drop lane plus one choice lane to balance traffic between the two lanes on SR 518. The two ramp lanes would then split, with one headed toward SB and one headed toward NB I-5. This concept would most likely require the starting point of the new ramp to back-up into the existing EB off-ramp to 51<sup>st</sup> Avenue S. This exit ramp needs to be maintained in order to provide access to the City of Tukwila



**Figure 6.11**  
**Tukwila Interchange Concepts**

**No Action**



**Concept 1 - Continue  
2nd EB Lane**



**Concept 2 - Right-Side Ramp**



**Concept 3 - New 3rd Lane**



**Concept 4 -Ramp  
Configurations**





- Construction of independent ramps to NB I-5 and SB I-5. Under this variant, a ramp consisting of a drop lane plus one choice lane to I-5 NB would precede the existing ramp to I-5 SB; cutting under SE 518 and join the existing (left side) NB ramp to I-5.

Construction of the right-side ramp concept would most likely require some additional right-of-way in the southwest quadrant.

### **Concept 3 - New 3<sup>rd</sup> Lane**

#### **Concept Description**

The new 3<sup>rd</sup> EB lane concept at the Tukwila Interchange involves the addition of a third EB GP lane starting at the Airport or SR 99 interchange (as an add lane) and continuing through the Tukwila interchange, ending in a drop-lane ramp exit to I-5. Evaluation of the corridor suggests that sufficient space exists between the current roadway and the unstable slope to the south to accommodate an additional lane.

A third EB lane through this segment is required to accommodate the anticipated future traffic volumes. High volumes (5940 vehicles per hour in the PM peak hour) are forecast for this segment by 2025, which will well exceed existing capacity (estimated at 4200 vehicles per hour), resulting in a peak volume to capacity (V/C) ratio of 1.41. Adding a third lane would reduce the V/C ratio to a more reasonable level (around 0.90), and result in LOS E operations during peak periods.

From a traffic operations perspective, the third lane should be implemented with or follow construction of concept 2 (Right-side Exit to I-5 NB), so that the existing weaving problem is not compounded further. Construction of these improvements in this order would also facilitate lane-balance through the corridor.

Construction of the 3<sup>rd</sup> EB lane concept would take place approximately between milepost 2.25 and 3.01. The typical mainline sections would be similar to the 3-lane section shown previously in Figure 4.3.

### **Concept 4 - Two-Lane Ramps**

#### **Concept Description**

Ramp configurations were not strictly evaluated as separate concepts per se, but were assessed based on ability to meet demand forecasts as well as maintain (or establish) lane balance on the mainline corridor (particularly when the proposed I-405 Corridor Plan improvements are realized). In many cases, additional ramp lanes would improve capacity on the ramps, but would also necessitate additional mainline lanes to maintain lane balance. Since the ability to add additional lanes beyond what is proposed in this RDP is severely limited, most ramps are not recommended for expansion beyond a single lane even though moderate to heavy congestion may occur under the existing configuration during the peak periods. Ramp lanes were instead determined based on the total number of exit and entrance lanes allowable given the recommended mainline configurations, and then assigned to particular movements based on priority established by projected demand.

#### **6.2.4.2 RECOMMENDED CONCEPT FOR THE TUKWILA INTERCHANGE**

The recommended route development concept for the Tukwila Interchange essentially combines the screened concepts into a single concept that can be established incrementally (Figure 6-12). This allows the improvements to be staged to complement construction the major corridor improvements proposed for the I-405 corridor.

This recommended concept for the Tukwila Interchange includes the following components:

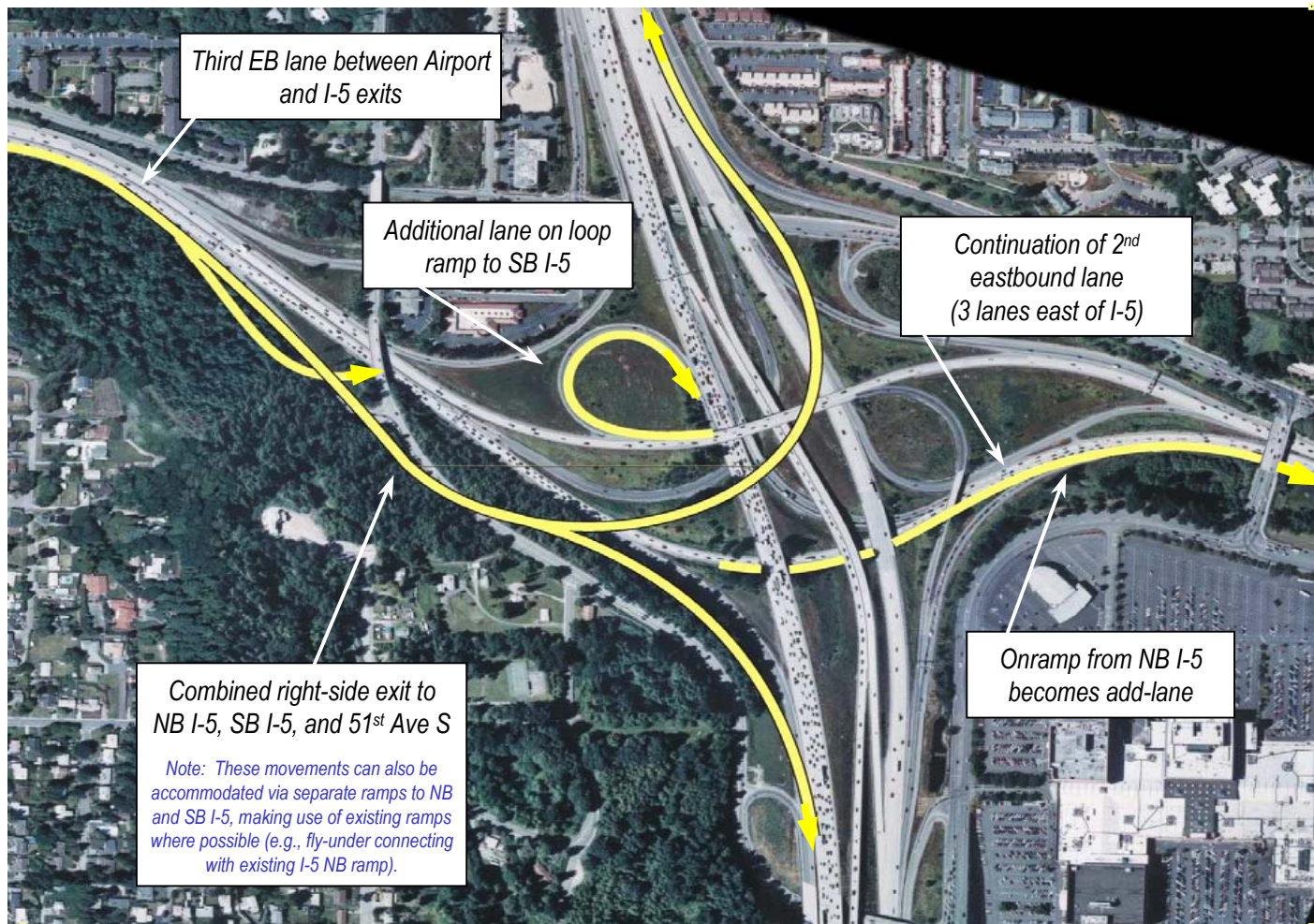
1. Continuation of the inside EB lane through the Tukwila interchange, connecting with the add-lane now provided at Andover Park, to maintain two lanes through the entire interchange area. This improvement could be completed in the near-term as a possible transportation systems management (TSM) project.
2. Relocate the left-side EB SR 518 to NB I-5 ramp to the right side of SR 518; consider combining with the EB to SB ramp as a single I-5 exit, coordinated with 51<sup>st</sup> Avenue S. Reserve the existing left-hand exit for a potential high occupancy vehicle (HOV) direct access ramp. This ramp could fly over the entire interchange and reconnect on the right side of I-5, or could instead pass under the interchange and continue to connect to the left side of NB I-5. The latter option would allow the ramp to continue to provide combined HOV and general-purpose traffic with direct access to the NB I-5 HOV lanes as well.
3. Construct a third EB lane on SR 518 from either the EB on-ramp from the Airport North Access Expressway (NAE) or SR 99 to the newly realigned I-5 ramp. Addition of this lane must occur concurrent with or after the realignment of the EB SR 518 to NB I-5 ramp from the left- to the right-hand side.
4. Addition of auxiliary lanes as appropriate to achieve lane balancing with the proposed I-405 Corridor Improvements, as well as address the distribution of demand. This would include an additional lane added to the WB to SB ramp (one additional lane), and establishing an add lane at the NB I-5 to EB I-405 ramp (concurrent with I-405 improvements).

As development of the recommended concept advances, consideration of connecting the WB I-405 to NB I-5 HOV ramp directly to the I-5 NB HOV lane should be evaluated. This connection currently enters I-5 on the right side, rather than adjacent to the HOV lane on the left.

#### **Impacts of the Proposed Action**

The EB mainline through the interchange (milepost 3.1 – 3.7) has been identified as a HAC, with a high incidence of rear-end and side-swipe incidents. There are several successive operations which occur within this segment, including a rightside offramp to 51<sup>st</sup> Avenue S, a leftside offramp to NB I-5, a rightside offramp to SB I-5, and the merge from two mainline lanes to one mainline lane. All of these operations would contribute to this area having a high incidence of accidents. The recommended concepts for this interchange area would remove the leftside exit and combine these three ramps into either a single rightside offramp or two consecutive rightside ramps, thereby eliminating a majority of the weaves throughout this segment. The third EB lane between SR 99/Airport and the Tukwila Interchange would also

**Figure 6.12**  
**Recommended Concept for the Tukwila Interchange**



reduce congestion throughout this segment; rear-end and sideswipe incidents are most closely associated with congested operating conditions. The continuation of a second EB through-lane would further reduce the need for merges and weaving.

In addition to the HAC discussed above, a HAL also exists at the end of the EB off-ramp to 51<sup>st</sup> Avenue S. This HAL involves at-angle collisions from ramp traffic with through-traffic on 51<sup>st</sup> Avenue S. This intersection is currently unsignalized. Re-alignment of this off-ramp could potentially improve sight distance, as well as provide an opportunity for installation of intersection control if desired.

Impacts to freight mobility would be expected to be positive. Freight connections both to and through the corridor would be beneficially impacted by the improvements to congestion and operations expected from the recommended concept. The proposed configuration would present a much less complicated interchange and set of decision points for a driver. Improvements that would benefit operations and safety would also benefit freight mobility, travel time savings, and costs.

## **6.3 CORRIDOR-WIDE APPLICATIONS**

### **6.3.1 Transportation System Management**

A transportation systems management (TSM) concept is not anticipated to be viable within the SR 518 corridor due to the fact that many of the available TSM and transportation demand management techniques typically available are incorporated into the defined No Action or various recommended improvement concepts. Some of the TSM applications contained in, or complimentary to, the recommended concepts include:

- **Signal Synchronization:** Synchronization of signals whenever possible would be an important aspect to maximizing operations for any concept. Locations that could potentially benefit from synchronization of traffic signals are (1) the SR 509 interchange with the signal at 1st Avenue S/SW 148th Street; and (2) existing or proposed signalized intersection in the S 154th Street, 24th Avenue S and SR 99 corridors proximate to the recommended interchange improvements.
- **Ramp Metering:** On-ramp metering is not recommended for application on the west end of the corridor, where mainline and arterial demand characteristics at Des Moines Memorial Drive do not indicate a need. Ramp metering could potentially provide some system benefit to the freeway mainline at the S 154th Street/24th Avenue S and SR 99 interchanges, though holding capacity of the ramps and impacts on the surrounding arterials could be problematic. Additionally, potential integration of these ramps with the NAE ramps may preclude ramp metering. At 51st Ave S, ramp metering could benefit the freeway by regulating the flow onto the EB mainline immediately downstream from the on-ramp from SB I-5.
- **Channelization Applications:** Improved channelization to provide left-turn pockets could benefit traffic operations in a number of locations, including S 154th Street for EB traffic accessing the WB on-ramp. Additionally, a restriction on left-turns from WB SR 518 traffic onto 1st Avenue S for traffic coming off of the SB ramp at the SR 509 interchange would greatly reduce weaving and improve safety in this interchange area. Utilization of the

interchange to the north at S 146th Street is recommended instead for traffic destined to SB 1st Avenue South. Appropriate signage would be required to support this policy restriction.

- **Lane Continuity and Balancing:** The additional EB lane on SR 518 proposed between the I-5 off-ramps and Andover Park may be considered a TSM component in that its primary benefit is to improve the operations on the existing two-lane segments to the east and west.
- **Improved Signage:** Potential applications of improved signage could benefit operations throughout the corridor. Early, clear direction for airport-bound traffic would help distribute traffic into appropriate lanes while minimizing driver confusion and indecision. Identification of SR 509 as an alternate route into Seattle could help establish a more balanced travel pattern that better uses available capacity in the SR 509 corridor. Signage directing SB SR 509 traffic bound for SB 1st Avenue S to use the S 146th Street exit would reduce confusion at the S 148th Street/1st Ave S intersection, as well as reduce demand at the SR 509/SR 518 interchange.
- **Transit Accommodation:** A new Sound Transit LINK park-and-ride station at SR 99, along with fully developed transit plans for the area are already components assumed in the No Action for the corridor.

## **6.3.2 High-Occupancy Vehicle Treatments**

### **6.3.2.1 HOV BACKGROUND AND CHARACTERISTICS**

Currently, High Occupancy Vehicle (HOV) lanes are provided on the I-5 and I-405 corridors, but not on the SR 518 corridor. Direct HOV connections between SB I-5 and NB I-405, as well as SB I-405 and NB I-5 are also provided. The Puget Sound HOV Pre-Design Studies Final Report (May 5, 1997), which is intended to guide development of HOV facilities in the region, does not propose HOV lanes for the SR 518 corridor, though a direct connection between the SB I-5 HOV lanes and the WB SR 518 mainline is recommended.

For the SR 518 corridor, existing vehicle occupancy and classification counts were presented in chapter IV of this report. Higher HOV volumes were seen on the eastern half of SR 518, at times more than one-third of the overall peak-hour traffic stream. Existing mode splits under various occupancy restrictions on the eastern and western portions of the facility are presented in Table 6.1. Existing HOV volumes for the peak periods are presented in Figure 6.13.

Future HOV volumes were based on existing mode splits applied to the No Action Plus volumes presented in chapter V. Although this approach does not consider the possibility of modal shift induced by new HOV facilities or other improvements along the corridor, it provides general insight into HOV demand on the corridor, and a beginning point for further analysis if required. Forecasted 2025 No Action Plus HOV volumes are presented for various occupancy restrictions in Figure 6.14. *(Note - while the existing HOV volumes were presented for the entire three-hour peak period in Figure 6.13, the future volumes in Figure 6.14 are presented for the peak hours).*

**Table 6.1**  
**Existing Mode Split for Various HOV Definitions**

	2+	3+	4+	Vans & Transit Only
<b>24th Avenue S Overpass</b>				
Eastbound AM	15.8%	2.9%	1.4%	0.9%
Westbound AM	13.0%	2.1%	1.2%	1.1%
Eastbound PM	28.1%	4.6%	1.2%	0.4%
Westbound PM	20.7%	2.7%	1.0%	0.7%
<b>51st Avenue S Overpass</b>				
Eastbound AM	15.5%	1.6%	0.9%	0.7%
Westbound AM	22.8%	2.7%	1.4%	1.3%
Eastbound PM	23.2%	4.1%	1.7%	1.0%
Westbound PM	34.5%	7.0%	2.8%	1.2%

Source: TRAC data compiled by Parsons Brinckerhoff

### **6.3.2.2 CONCEPT EVALUATION PROCESS**

A conceptual-level analysis was conducted to determine the potential need for, and feasibility of HOV facilities in the corridor. A screening process compared potential HOV system characteristics of SR 518 with thresholds established by WSDOT's HOV System Policy. Existing and potential HOV demand, overall traffic volumes, corridor capacity, travel patterns, and system continuity were considered. Additionally, a screening analysis was performed to determine operational, physical, and cost feasibility for mainline HOV lanes on SR 518. Methodologies and findings are described in Appendix D.

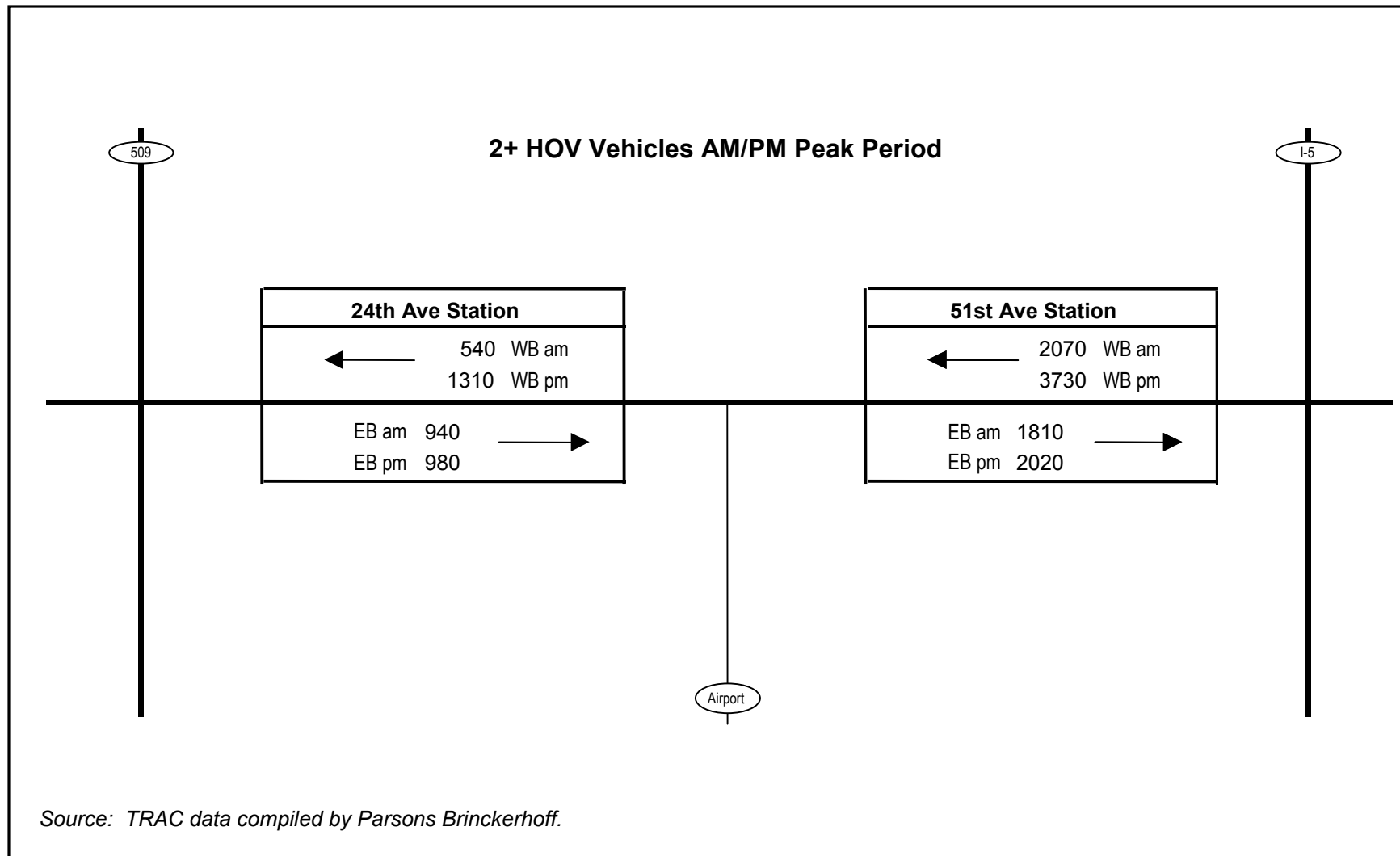
The planning-level analysis presented in this section is intended to demonstrate where need for HOV facilities exists, and what opportunities might exist to meet those needs. Therefore, the concepts presented have not been evaluated in-depth, and would require a separate planning and engineering process to develop further.

### **6.3.2.3 INITIAL EVALUATION OF CONCEPTS AND CORRIDOR RECOMMENDATIONS**

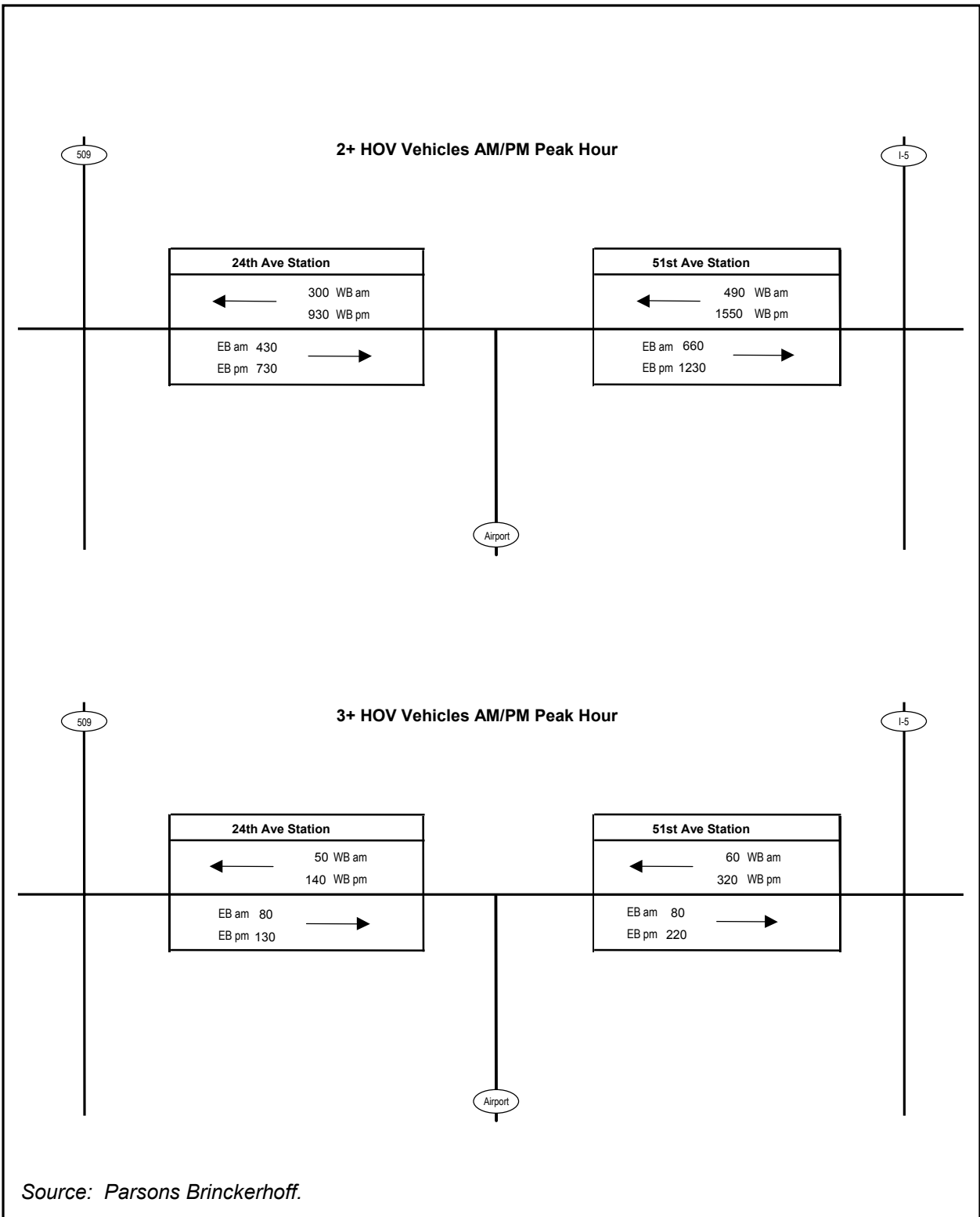
Due to unique physical and operating conditions, three sections of the corridor were considered for HOV improvements: The western half of the facility (SR 509 to Airport), the eastern half of the facility (Airport to I-5), and the Tukwila interchange.



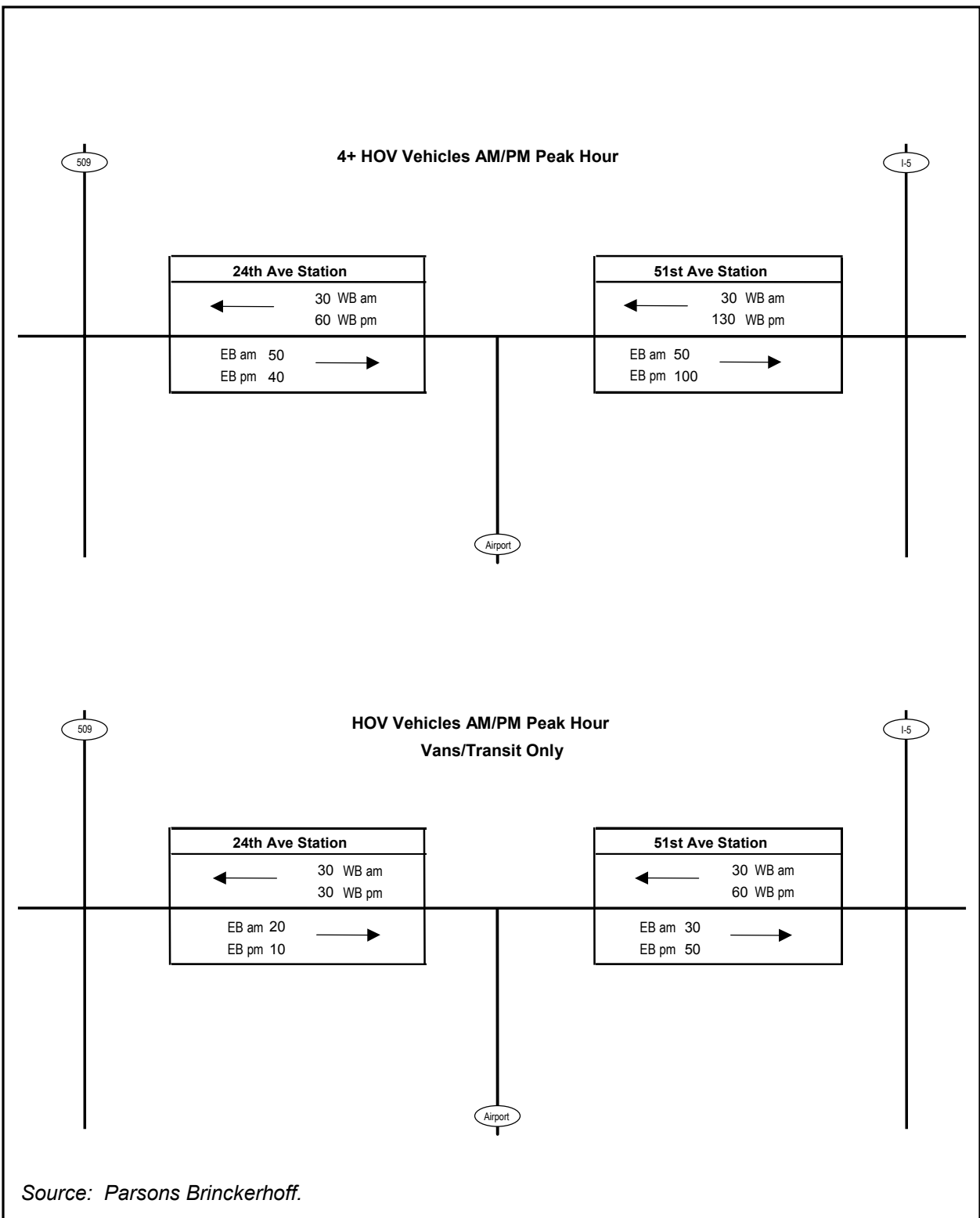
**Figure 6.13**  
**Existing HOV Volumes**



**Figure 6.14a**  
**2025 No Action Plus HOV Volumes**



**Figure 6.14b**  
**2025 No Action Plus HOV Volumes**



The western portion of the corridor did not show a strong need for, nor substantial benefit resulting from designated HOV lanes. HOV facilities on this segment would not provide a significant travel time advantage over the general purpose lanes, nor would they be expected to receive a high degree of use.

The eastern portion of the corridor showed a higher degree of potential need, based on forecast traffic volumes and roadway operating characteristics. However, severe physical constraints were deemed to be fatal flaws to implementing mainline HOV improvements between the airport and I-5. These included a limited opportunity for expanding SR 518 to accommodate additional (HOV) lanes, and the inability to accommodate direct HOV movements at both the Tukwila and SR 99/NAE interchanges in tandem.

HOV improvements considered at the Tukwila interchange would focus effort on supporting the transition to and from existing HOV facilities on I-5 and I-405. Several concepts were developed for an EB to NB HOV ramp. The recommended realignment of the EB to NB left-hand general purpose ramp to the right side of SR 518 will potentially leave an EB to NB inside-to-inside direct ramp vacant. This ramp could be used for authorized HOV access to I-5 (Note: to maintain acceptable levels of service on SR 518 and avoid reintroduction of a weave movement, access would likely be restricted to authorized vanpools and transit). This concept is illustrated in Figure 6.15a. A second concept would be to provide a drop-down ramp off of the recommended right-hand off-ramp to north- and SB I-5 (Figure 6.15b). This concept would be more costly but would keep all exiting vehicles on the right-hand side, and avoid complicating weaving maneuvers for HOV vehicles accessing SR 518 at the Airport or SR 99 ramps.

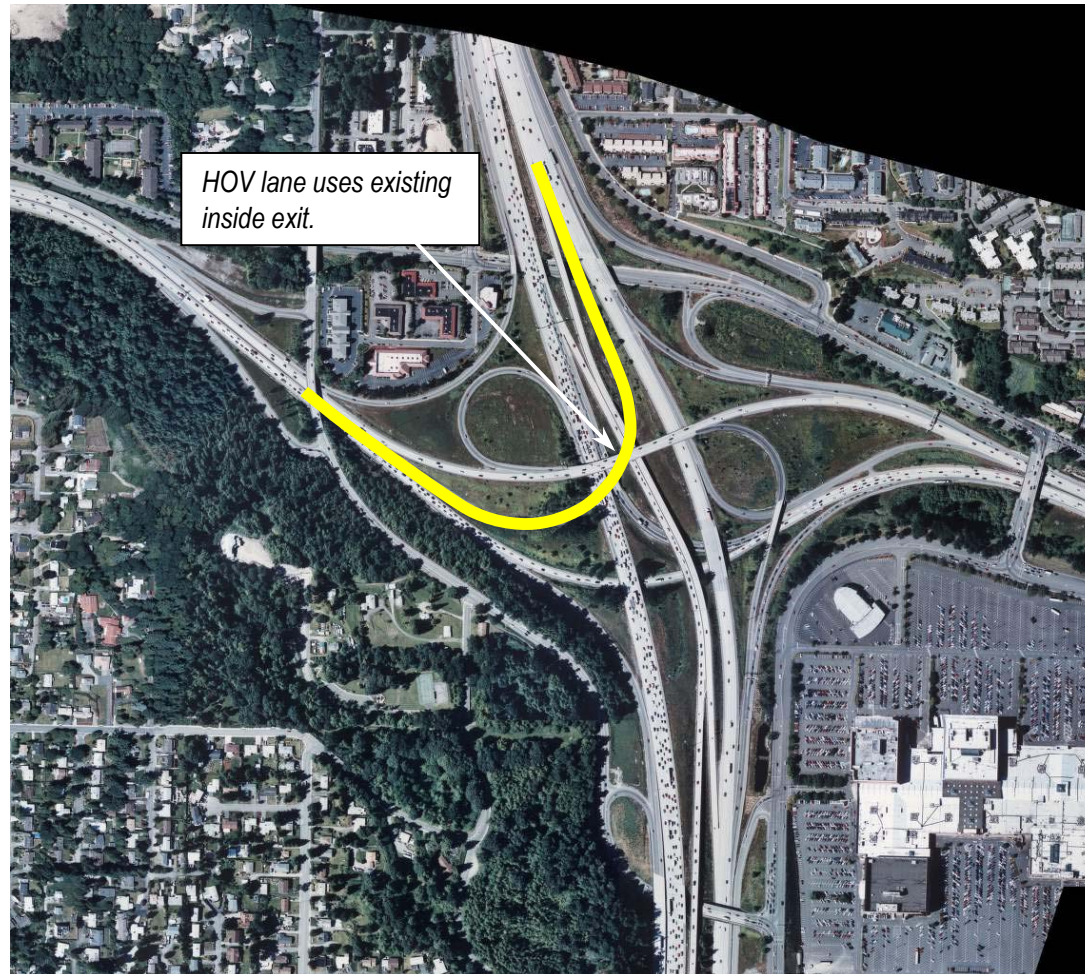
Concepts were also developed for the SB to WB movement. Lack of direct access from the HOV lanes on I-5 to SR 518 requires that HOV traffic on I-5 merge across five lanes of traffic in order to access the SR 518 off-ramp. A further consideration is that HOV traffic should be positioned on the outside of the SR 518 mainline (rather than directed to the center of SR 518), so that access to the airport and other locations does not require further weaving.

Given these challenges, improvements for HOV connections between I-5 and SR 518 might best be accommodated on I-5, upstream of the Tukwila interchange. Concepts considered to accommodate such a movement include; (1) a SB to WB fly-over ramp provided off of the existing SB HOV through lane, linking up with the existing SB to WB GP ramp (Figure 6.16a); and (2) a flyover ramp further upstream (possibly at SR 599) to transition airport bound HOVs from the center I-5 HOV lanes to the outside general-purpose lanes so that they can use the existing or reconfigured general purpose ramps to SR 518 (Figure 6.16b).

These HOV recommendations for HOV facilities are consistent with the recommendations presented in the Puget Sound HOV Pre-Design Studies Final Report (May 5, 1997), which did not recommend HOV lanes on the SR 518 mainline, but did recommend a new direct HOV connection between SB I-5 and SR 518. The RDP recommendations modify the Puget Sound recommendation only by additionally recommending that the complementary access (EB to NB I-5) be provided as well if general-purpose access is moved to the right side of I-5. Also, the RDP suggests that SB I-5 direct access may be more easily implementable, and more effective, if it instead focuses on moving HOVs to the right side general purpose off ramp, so that HOVs are lined up for the SR 99 and Airport exists downstream on SR 518.

HOV improvements to the existing WB to NB connection were not evaluated (this movement is an I-405 to I-5 movement). However, selection of a preferred concept for the EB to NB general-

**Figure 6.15a**  
**Suggested HOV Concepts (Eastbound to Northbound & Eastbound Through)**





**Figure 6.15b**  
**Suggested HOV Concepts (Eastbound to Northbound & Eastbound Through)**

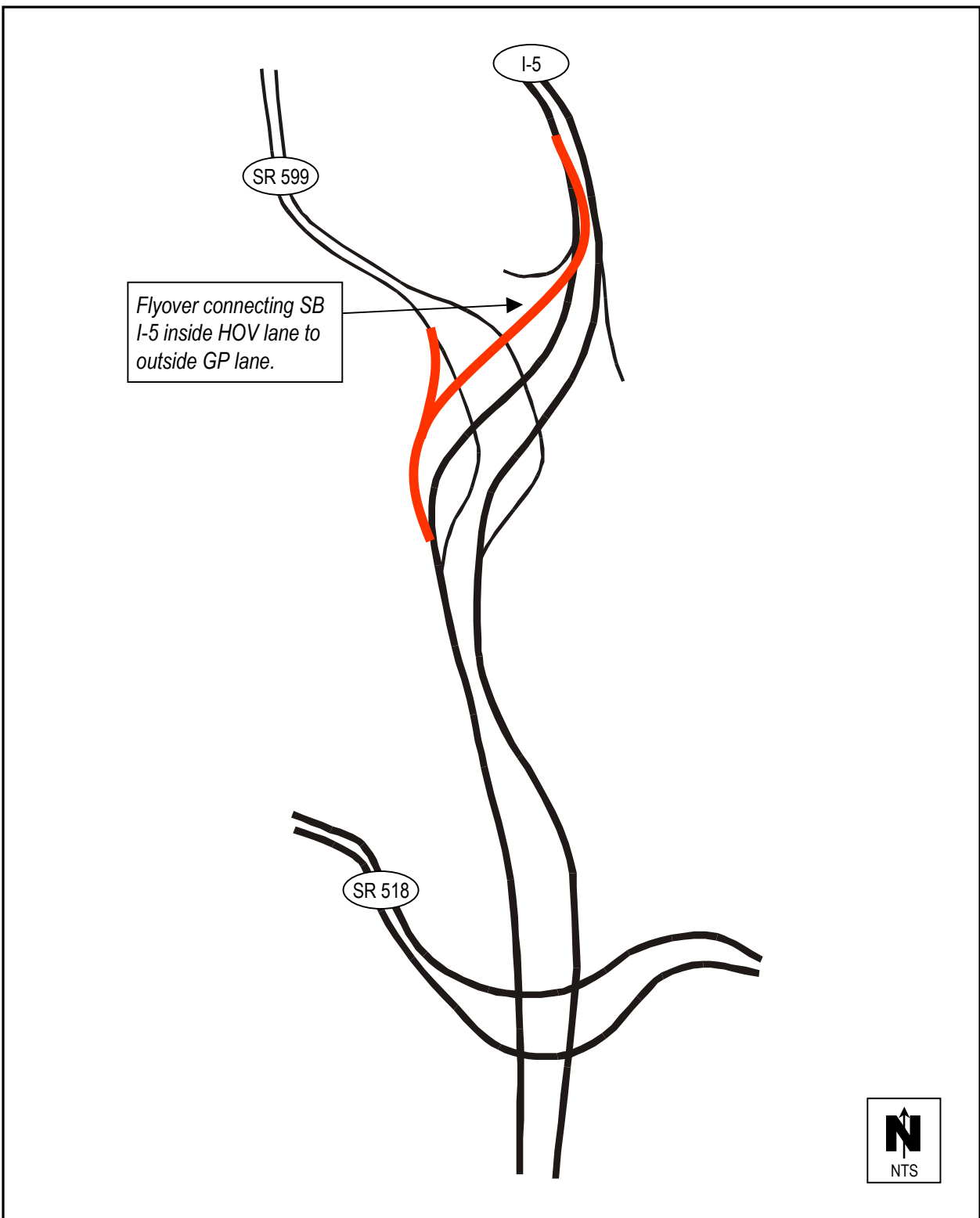


**Figure 6.16a**  
**Recommended HOV Concepts (Southbound to Westbound)**





**Figure 6.16b**  
**Recommended HOV Concepts (Southbound to Westbound)**



purpose ramp affects the ability to relocate the WB to NB HOV ramp to provide direct “inside to inside” connections in the future. As the Tukwila interchange options move into more detailed consideration, this concept of improved WB to NB HOV connections should be considered in the context of other connection needs, lane balancing, interchange operations, and cost effectiveness.

### ***Impacts of the Proposed Action***

The EB mainline has been identified as an HAC from milepost 3.1 to 3.7, the segment from before the off-ramp to 51<sup>st</sup> Avenue S to after the off-ramp to SB I-5, with a high incidence of rear-end and side-swipe incidents. There are several concurrent operations which occur within this segment, including a rightside offramp to 51<sup>st</sup> Avenue S, a leftside offramp to NB I-5, a rightside offramp to SB I-5, and the merge from two down to one mainline through-lane. All of these operations would contribute to this area having a high incidence of accidents. The recommended EB to NB HOV concepts for this interchange area would either remove the leftside exit for general purpose traffic, or remove the leftside exit for all traffic. Either option reduces the majority of weaves through this segment.

In addition to the HAC discussed above, a HAL also exists at the end of the EB off-ramp to 51<sup>st</sup> Avenue S. This HAL involves at-angle collisions from ramp traffic with through-traffic on 51<sup>st</sup> Avenue S. This intersection is currently unsignalized. Re-alignment of this off-ramp (through the EB to NB right-side concept) could potentially improve sight distance, as well as provide an opportunity for installation of intersection control if desired.

Impacts to freight mobility would also be expected to be positive. Freight connections both to and through the corridor would be improved by the streamlined interchange and direct connect ramps. Improvements that would benefit operations and safety would also benefit freight mobility, travel time savings, and costs.

## **VII. PUBLIC INVOLVEMENT**

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### **7.1 PUBLIC INTERACTION PLAN**

A Public Interaction plan was developed for the overall SR 518 Study (which includes the RDP as well as subsequent environmental assessment of the central corridor segment). This plan is presented in Appendix F, while activities carried out in support of the RDP are summarized in this chapter.

#### **7.1.1 Goals for the Public Interaction Plan**

The Public Involvement Program (PIP) had the following goals:

- To inform all stakeholders in the project area about the Route Development Plan and its outcomes.
- To engage these stakeholders in selecting the best options for corridor improvements.
- To develop stakeholder support for the outcome of the Route Development Plan, and continue this support through the EA process, and through design and construction of the identified improvements.

#### **7.1.2 Strategies to Involve the Public**

The project team utilized the following strategies during the SR 518 Route Development Plan process to guide public involvement activities and achieve plan goals:

- Project Advisory Committee
- Comprehensive Mailing List (Residents in proximity to the corridor)
- Newsletter
- Paid Advertisement (to publicize Open House)
- Public Open House and Agency Meeting.
  - *Handouts and Questionnaires*

#### **PROJECT ADVISORY COMMITTEE**

A Project Advisory Committee (PAC) consisting of representatives from the jurisdictions in the project area, as well as from other government agencies, was convened at the start of the RDP study. The PAC provided guidance and input to the SR 518 RDP alternatives development, analysis, evaluation, and recommendations. Summaries of each PAC meeting are presented in Appendix F, as is a list of PAC attendees.

#### **COMPREHENSIVE MAILING LIST**

Existing WSDOT mailing lists were used to distribute over 2,500 newsletters and open house announcements to interested parties in and around the study area. In addition, another 5,000 postcards were mailed using carrier routes to businesses and residents in the area affected by the study.



## **NEWSLETTERS**

A newsletter (Appendix F) describing the study and its initial findings was distributed to the project mailing list in October, 2001. The purpose of the newsletter was to inform the public of study progress and initial findings, and announce a public open house.

## **PAID ADVERTISEMENTS**

The public open house was extensively advertised in local papers. The Seattle Times, Seattle P.I. and South County Journal all ran display ads providing wide-spread notice of the meeting. Ad dates were as follows:

- |   |             |
|---|-------------|
| • Seattle Times/ PI                                 | 9/24 & 10/8 |
| • Seattle Times/PI Legal                            | 9/27 & 10/5 |
| • Tacoma News Tribune                               | 9/24 & 10/5 |
| • South County Journal                              | 9/24 & 10/5 |
| • Federal Way News & Highline Times/Des Moines News | 9/26 & 10/3 |

## **PUBLIC AND AGENCY MEETING**

On October 10, 2001, two open house meetings were held to take public comment on the draft RDP, and additionally take scoping comments on the SR 99 / S 154<sup>th</sup> St / 24<sup>th</sup> Ave S intersection Environmental Assessment. These meetings presented study progress, findings, and preliminary recommendations, and sought input on all aspects of the study. Input gathered at these open house was considered in finalizing the recommendations and compiling this RDP.

A diverse range of more than 25 local, state tribal, and federal agencies were invited to attend the afternoon session. The Public Open House was held the same evening, and mirrored the Agency Open House in format and content.

## **Handouts and Questionnaires**

In addition to display materials, the public meetings utilized handouts summarizing the study progress and soliciting input from attendees. These items are included in Appendix F.

Primary among comments received at the agency meeting was the request that appropriate consideration be given to coordinating projects recommended in the RDP with other planned projects, especially Sound Transit's light rail, the SR 509 Extension and the South Airport Expressway. A secondary concern expressed in agency comments reflected the need to coordinate closely with the three cities in the project area to ensure that traffic patterns and access match projected and planned land use. No comments were received that indicated an inappropriate level of planning or analysis.

Most public comments were concerned with improved access and mobility, especially at SR-99 to S. 154<sup>th</sup> St/24<sup>th</sup> Ave S, but also connections to I-5 and I-405 on and off ramps and merging on to SR 518 eastbound from the North Airport Expressway. Comments were also received that raised how construction of the RDP recommended projects would be managed in light of the proposed Third Runway project at Sea-Tac Airport. Issues raised were related to project construction sequencing and delays, environmental constraints, and air quality. A small number of public comments touched on the coordination with other planned projects, especially light rail. Written public comments totaled 15, four of which were specific to the scope of the EA.

## VIII. COST ESTIMATES, FUNDING, AND IMPLEMENTATION OF THE RDP

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### 8.1 COST ESTIMATES

An opinion of cost was prepared for the concepts recommended in the Route Development Plan. The costs presented are order-of-magnitude only, and are based on planning-level conceptual sketches. They do not represent engineering-level estimates. Furthermore, risks to implementation that are not known at the time of RDP preparation could result in changes to these estimates as more detailed engineering and environmental data are collected and defined.

The estimates include capital costs only; they do not include right-of-way purchase, environmental mitigation, WSDOT expenses, legal fees, financing, project inflation to construction time, or operating and maintenance costs.

Assumptions made for the opinion of cost calculations are as follows:

#### General

- Cost data Year 2000 costs
- All grade separations 25 feet
- All slope grades 2:1
- Acceleration ramp lengths 800 feet (except as noted)
- Deceleration ramp lengths 500 feet (except as noted)

#### SR 509 Interchange

- SPUI utilizes existing ramp connections to SR 509
- South-to-east direct ramp (2-lane) 2600 feet
- Existing bridge lengthening 60 feet
- SPUI ramps 1200 feet each

#### 24<sup>th</sup> Avenue S/SR 99 Interchange

- 24<sup>th</sup> Avenue S bridge length 250 feet
- SR 99 bridge length 300 feet
- Four-lane C-D road 1800 feet
- WB by-pass lane 1000 feet
- Total ramp length (8 ramps) 7700 feet
- Need for central pier at 24<sup>th</sup> Avenue S bridge and displacement of WB freeway lanes for 1800 feet

#### Tukwila Interchange

- Right-side ramp to NB I-5 6100 feet
- Ramp to SB I-5 1300 feet
- 3rd lane SR 99-Tukwila 3000 feet
- 2nd lane Tukwila-SR 167 2800 feet

#### Unit Costs

- Traffic signals \$200,000/intersection (\$400,000 for SPUI)
- Bridge structures \$130/square foot

- Paving \$25/square foot
- Jersey barriers \$75/linear foot
- Walls \$60/square foot
- Excavation \$15/cubic yard
- Backfill \$30/cubic yard
- Drainage \$300,000/acre
- Luminares \$10,000 each
- Mitigation 10% of capital costs without drainage
- Contingency 40%

A large contingency percentage has been included to account for unknown factors in the implementation of the recommended concepts. The opinion of cost for recommended improvements to the SR 509, 24<sup>th</sup> Avenue S/SR 99, and Tukwila interchanges is presented in Tables 8.1, 8.2, and 8.3 respectively.

## 8.2 FUNDING & IMPLEMENTATION

The recommended concepts identified in the SR 518 RDP are new projects, and therefore are not yet identified in the State Highway System Plan. Of the concepts identified, only the 2<sup>nd</sup> EB lane at the Tukwila Interchange could be implemented on a near-term basis (as an interim measure prior to the I-405 corridor improvements). Other projects would inc

### 8.2.1 Other Study Area Projects

Projects in the study area identified as part of the 20-Year Mobility Strategy in the HSP include:

- HOV lanes on SR 509:
  - Northbound and southbound HOV lanes running continuously from the 1<sup>st</sup> Avenue South Bridge to SR 509's proposed new termination point at I-5 south of the Airport.
  - A southbound to eastbound freeway-to-freeway HOV connection to SR 518 with a fly-over ramp.

For funding purposes, the proposed SR 509 HOV lanes are not considered part of the Puget Sound Core HOV program.

- A southbound arterial HOV lane on SR 99, from SR 518 to Federal Way.
- Tukwila Interchange
  - Construction of a southbound to westbound freeway-to-freeway core HOV connection at the Tukwila interchange. This item is listed under the "Puget Sound Core HOV Lane Strategies."
  - Unspecified HOV "lanes and connections" at the Tukwila interchange. This item is listed as requiring further study.

Additional projects beyond the 20 Year Plan but listed as mobility strategies in the HSP include:

- An eastbound to northbound HOV freeway-to-freeway lane connection in the southeast quadrant of the Tukwila interchange.
- Widening for HOV lanes between SR 518 and SR 599. The City of Tukwila has requested that no HOV lanes be instituted on SR 99 north of SR 518, as the state route effectively operates as a local arterial in this segment and needs to retain its on-street parking.
- A Burien Transit Center Park-and-Ride lot in the SR 99/SR 518 interchange vicinity. This item is listed as requiring further study.

With the exception of the southbound to westbound HOV ramp at the Tukwila interchange mentioned above, all other recommendations in this report would require funding by other sources and/or need to be considered for funding in a future Highway System Plan.

**Table 8.1**

**Opinion of Cost for Recommended  
SR 509 Interchange Concepts**

Interchange Concept		Year 2001 \$
<b>SR 509 Interchange</b>		
SPUI (Optional)	\$	18,100,000
Contingency		7,200,000
Engineering and Construction Management		5,100,000
<b>Subtotal</b>		<b>30,400,000</b>
 Tunnel/Flyover		 12,000,000
Contingency		4,800,000
Engineering and Construction Management		3,400,000
<b>Subtotal</b>		<b>20,200,000</b>
 <b>TOTAL</b>		 <b>\$ 50,600,000</b>

**Notes**

Costs are for order-of-magnitude estimation purposes only.

Costs are for capital costs only and do not include right-of-way purchase, legal fees, WSDOT expenses, financing, inflation to construction time, or operations and maintenance.

Source: Parsons Brinckerhoff



**Table 8.2.a**

**Opinion of Cost for Recommended  
24th Ave S - SR-99 Concepts**

Interchange Concept	Year 2001 \$
<b>24th Avenue S - SR 99 Interchange (Split Diamond with Loop option)</b>	
24th Avenue S Configuration	\$ 13,300,000
Contingency	5,300,000
Engineering and Construction Management	3,700,000
<b>Subtotal</b>	<b>22,300,000</b>
Local Widening of SR 518	2,800,000
Contingency	1,100,000
Engineering and Construction Management	800,000
<b>Subtotal</b>	<b>4,700,000</b>
SR 99 Configuration	19,700,000
Contingency	7,900,000
Engineering and Construction Management	5,500,000
<b>Subtotal</b>	<b>33,100,000</b>
Two-Way Frontage Road	6,100,000
Contingency	2,400,000
Engineering and Construction Management	1,700,000
<b>Subtotal</b>	<b>10,200,000</b>
<b>TOTAL</b>	<b>\$ 70,300,000</b>

**Notes**

Costs are for order-of-magnitude estimation purposes only.

Costs are for capital costs only and do not include right-of-way purchase, legal fees, WSDOT expenses, financing, inflation to construction time, or operations and maintenance.

Source: Parsons Brinckerhoff

**Table 8.2.b**

**Opinion of Cost for Recommended  
24th Ave S - SR-99 Concepts**

Interchange Concept	Year 2001 \$
<b>24th Avenue S - SR 99 Interchange (SPUI and Half Diamond, Phased)</b>	
<b>Phase I</b>	
24th Avenue S Configuration	\$ 11,300,000
Contingency	4,500,000
Engineering and Construction Management	3,200,000
<b>Subtotal</b>	<b>19,000,000</b>
North (WB) CD Ramp (w/ Slip Ramp from S 154th St)	3,200,000
Contingency	1,300,000
Engineering and Construction Management	900,000
<b>Subtotal</b>	<b>5,400,000</b>
South (EB) Ramp	2,300,000
Contingency	900,000
Engineering and Construction Management	600,000
<b>Subtotal</b>	<b>3,800,000</b>
SR 99 Configuration (SPUI)	17,700,000
Contingency	7,100,000
Engineering and Construction Management	5,000,000
<b>Subtotal</b>	<b>29,800,000</b>
<b>Phase I TOTAL</b>	<b>\$ 58,000,000</b>
<b>Phase II (Requires Tukwila Interchange Improvements)</b>	
South (EB) CD Ramp (24th to NAE)	\$ 11,300,000
Contingency	4,500,000
Engineering and Construction Management	3,200,000
<b>Subtotal</b>	<b>19,000,000</b>
<b>Phase II TOTAL</b>	<b>\$ 19,000,000 *</b>

*\*Cost does not include widening to SR-518, which would be required prior to implementing phase II. Costs for widening SR 518 are shown under the Tukwila Interchange concept below.*

**Notes**

Costs are for order-of-magnitude estimation purposes only.

Costs are for capital costs only and do not include right-of-way purchase, legal fees, WSDOT expenses, financing, inflation to construction time, or operations and maintenance.

Source: Parsons Brinckerhoff

**Table 8.3**

**Opinion of Cost for Recommended  
Tukwila Interchange Concepts**

Interchange Concept	Year 2001 \$
<b>Tukwila Interchange</b>	
Widening of SR 518, 3rd lane SR 99 to Tukwila Int.	\$ 2,800,000
Contingency	1,100,000
Engineering and Construction Management	800,000
<b>Subtotal</b>	<b>4,700,000</b>
Widening of SR 518 through Interchange (2nd lane)	3,100,000
Contingency	1,200,000
Engineering and Construction Management	900,000
<b>Subtotal</b>	<b>5,200,000</b>
Modifications to Tukwila Interchange (Right-side exit)	26,100,000
Contingency	10,400,000
Engineering and Construction Management	7,300,000
<b>Subtotal</b>	<b>43,800,000</b>
<b>TOTAL</b>	<b>\$ 53,700,000</b>

**Notes**

Costs are for order-of-magnitude estimation purposes only.

Costs are for capital costs only and do not include right-of-way purchase, legal fees, WSDOT expenses, financing, inflation to construction time, or operations and maintenance.

Source: Parsons Brinckerhoff

## **APPENDIX A:**

## **LIST OF ABBREVIATIONS**

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CAA	Controlled Activity Area
DMMD	Des Moines Memorial Drive
DOE	Department of Energy
EA	Environmental Assessment
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
GP	General Purpose
HAC	High Accident Corridor
HAL	High Accident Location
HCS	Highway Capacity Software
HOV	High-Occupancy Vehicle
HSP	Highway System Plan
LOS	Level of Service
MP	Milepost
NEPA	National Environmental Policy Act
PAC	Project Advisory Committee
PIP	Public Involvement Plan
RDP	Route Development Plan
SEPA	State Environmental Policy Act
SPUI	Single-Point Urban Interchange
SR	State Route
TRAC	Washington State Transportation Center
TSM	Transportation Systems Management
V/C	Volume to Capacity ratio
VMT	Vehicle-Miles Traveled
WSDOT	Washington State Department of Transportation
WTP	Washington Transportation Plan

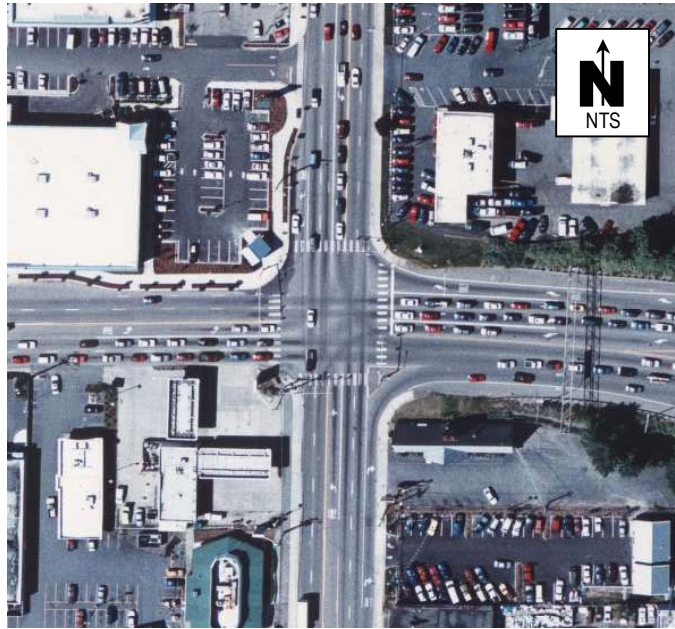
## **APPENDIX B:**

## **EXISTING CONDITIONS**

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**Figure B.1**  
**Existing Channelization at 1<sup>st</sup> Avenue S & SW 148<sup>th</sup> Street**

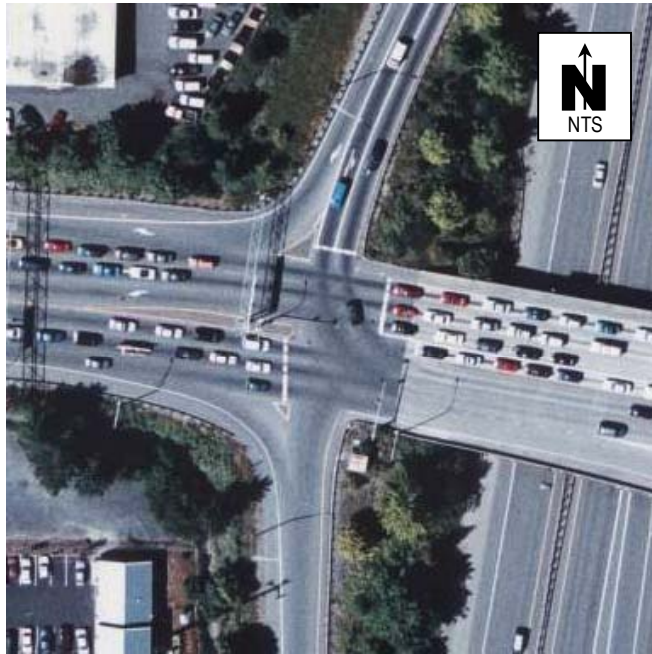
- Signalized
- NB Approach: 1 left, 2 thru, 1 right
- SB Approach: 1 left-thru, 2 thru, 1 right
- EB Approach: 1 left, 1 thru, 1 thru-right
- WB Approach: 1 left, 2 thru, 1 right





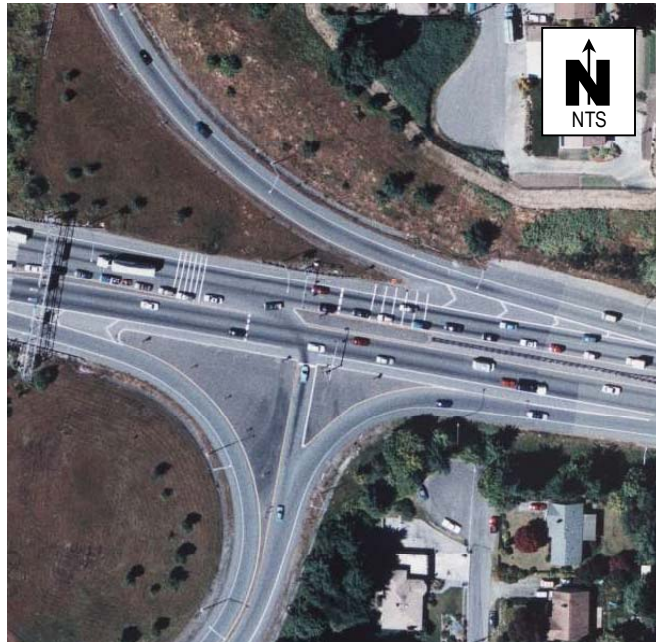
**Figure B.2**  
**Existing Channelization at SR 509 SB Ramps & SR 518**

- Signalized
- SB On-Ramp: 1 lane
- SB Approach: 1 left, 1 left-thru, 1 right
- EB Approach: 2 thru, 1 thru-right
- WB Approach: 1 left, 3 thru



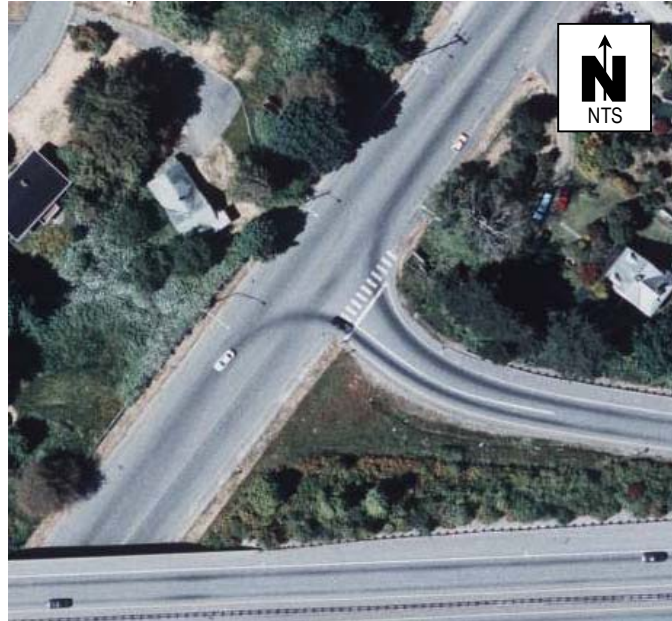
**Figure B.3**  
**Existing Channelization at SR 509 NB Ramps & SR 518**

- Signalized for NB left to WB, and E-W thru
- NB Approach: 1 left, 1 right
- NB On-Ramp: 1 lane
- EB Approach: 2 thru
- WB Approach: 2 thru



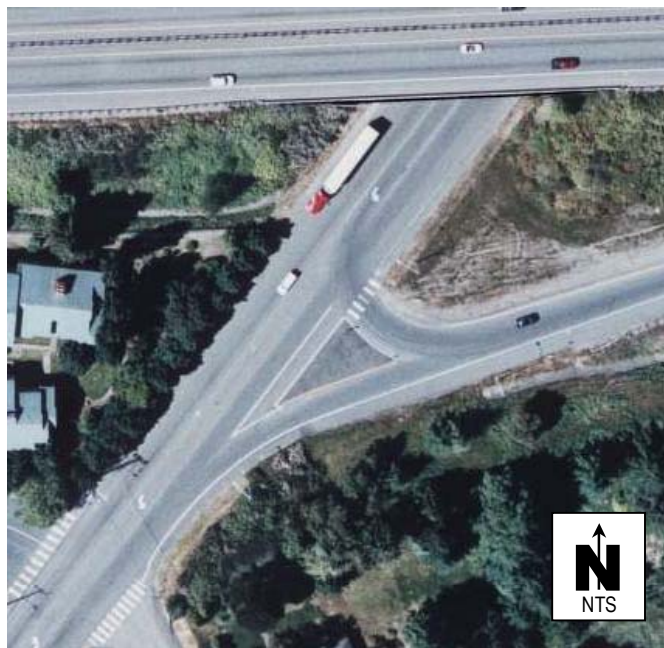
**Figure B.4**  
**Existing Channelization at DMMD & WB Off-Ramp**

- To be signalized per SeaTac Six-Year Plan (currently unsignalized)
- NB Approach: 1 thru
- SB Approach: 1 thru
- WB Off-Ramp: 1 left, 1 right
- Center turn lane



**Figure B.5**  
**Existing Channelization at DMMD & EB On-Ramp**

- Unsignalized
- NB Approach: 1 thru, 1 right
- SB Approach: 1 left, 1 thru
- EB On-Ramp: 1 lane
- Center turn lane



**Figure B.6**  
**Existing Channelization at S 154<sup>th</sup> Street:**  
**24<sup>th</sup> Avenue S, and EB Off-Ramp**

- EB Off-Ramp: 1 left, 1 right (stop controlled)
- 24<sup>th</sup> Avenue S: Signalized
- NB Approach: 1 left, 1 thru, 1 right
- SB Approach: 1 left-thru, 1 thru-right
- EB Approach: 1 left, 1 thru-right
- WB Approach: 1 left, 1 thru-right



**Figure B.7**  
**Existing Channelization at S 154<sup>th</sup> Street & WB On-Ramp**

- Unsignalized
- WB Approach: 1 thru
- EB Approach: 1 thru





**Figure B.8**  
**Existing Channelization at S 154<sup>th</sup> Street & WB Off-Ramp**

- Unsignalized
- WB Off-Ramp: 1 left, 1 right
- EB Approach: 1 thru
- WB Approach: 1 thru



**Figure B.9**  
**Existing Channelization at S 154<sup>th</sup> Street & SR 99**

- Signalized
- May be improved w/ City of SeaTac's Int'l Blvd Phase 3
- NB Approach: 1 left, 2 thru, 1 right
- SB Approach: 1 left, 2 thru, 1 right
- EB Approach: 1 left, 1 left-thru, 1 right
- WB Approach: 1 left, 1 thru, 1 th-right



**Figure B.10**  
**Existing Channelization at SR 99 & WB Off-Ramp**

- Unsignalized
- SB Approach: 2 thru
- NB Approach: 2 thru, 1 left
- WB Off-Ramp: 1



**Figure B.11**  
**Existing Channelization at SR 99 & EB On-Ramp**

- Signalized
- EB On-Ramp: 2 thru
- NB Approach: 2 thru, 1 right
- SB Approach: 1 left, 2 thru



**Figure B.12**  
**Existing Channelization at 51<sup>st</sup> Avenue S & WB On-Ramp**

- Unsignalized
- WB On-Ramp: 1 lane
- NB Approach: 1 left-thru
- SB Approach: 1 right-thru



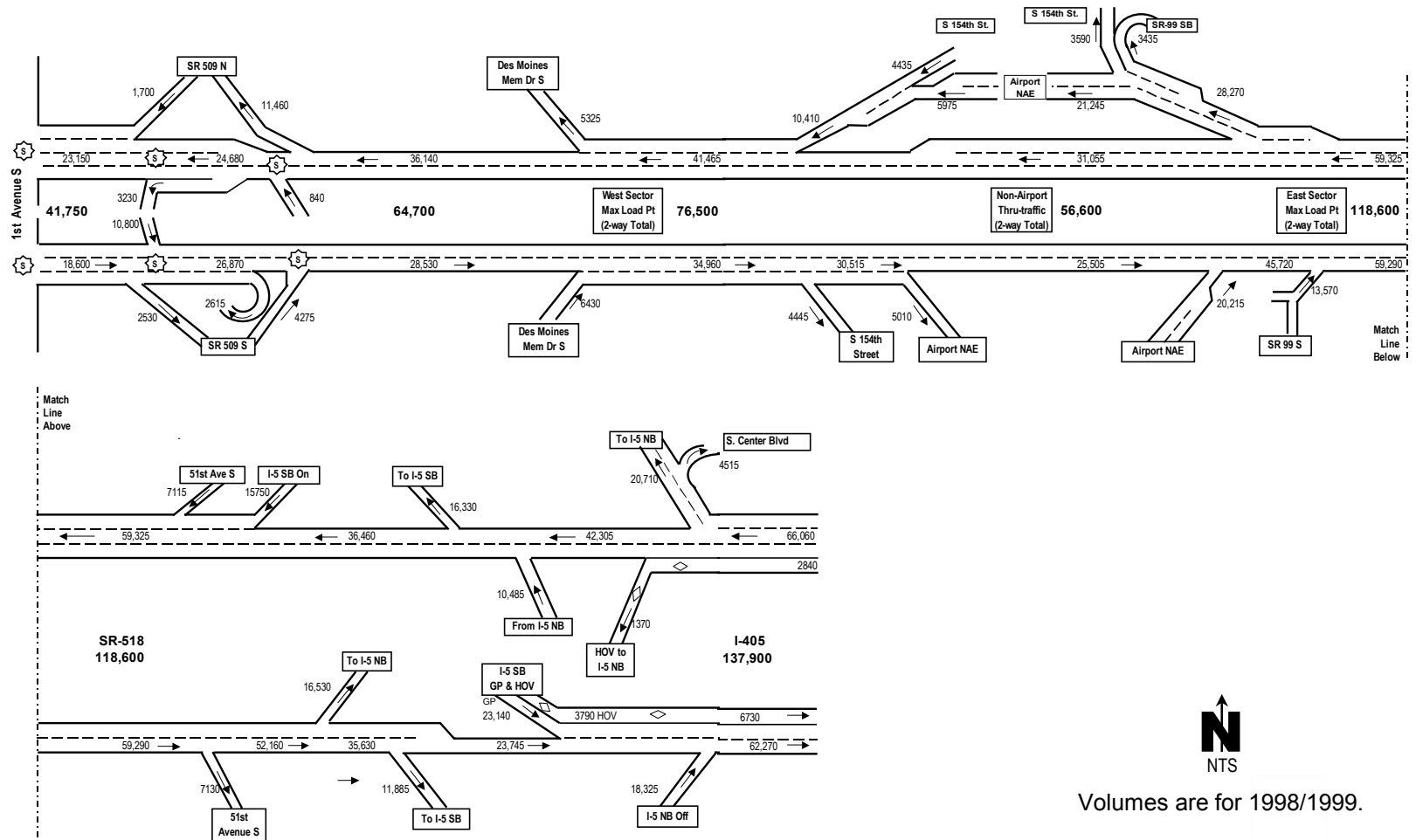
**Figure B.13**  
**Existing Channelization at 51<sup>st</sup> Avenue S & EB Off-Ramp**

- Unsignalized
- EB Off-Ramp: 1 left, 1 right
- NB Approach: 1 thru
- SB Approach: 1 thru



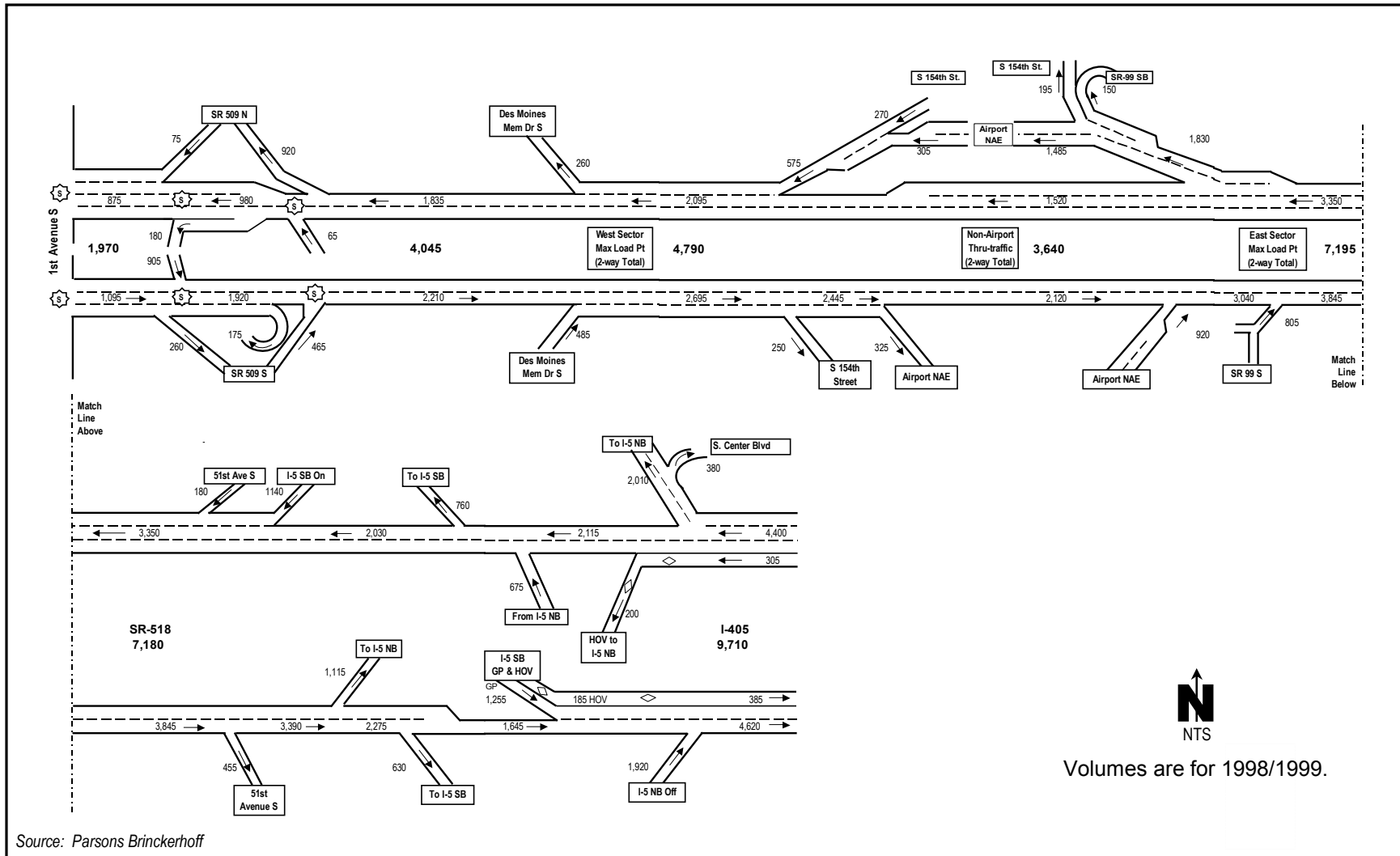


**Figure B.14**  
**Existing Average Weekday Ramp and Freeway Volumes**

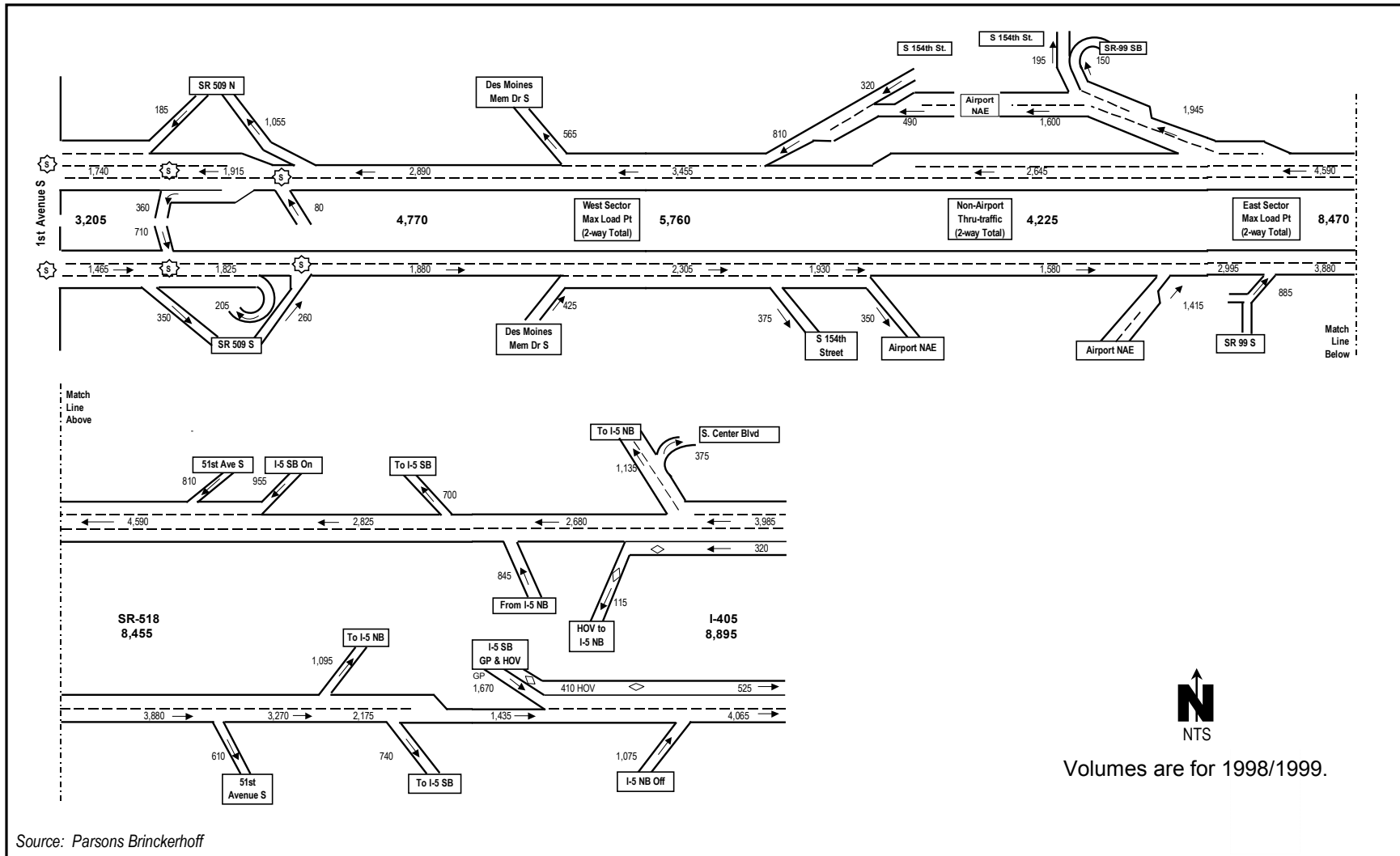


Source: Parsons Brinckerhoff

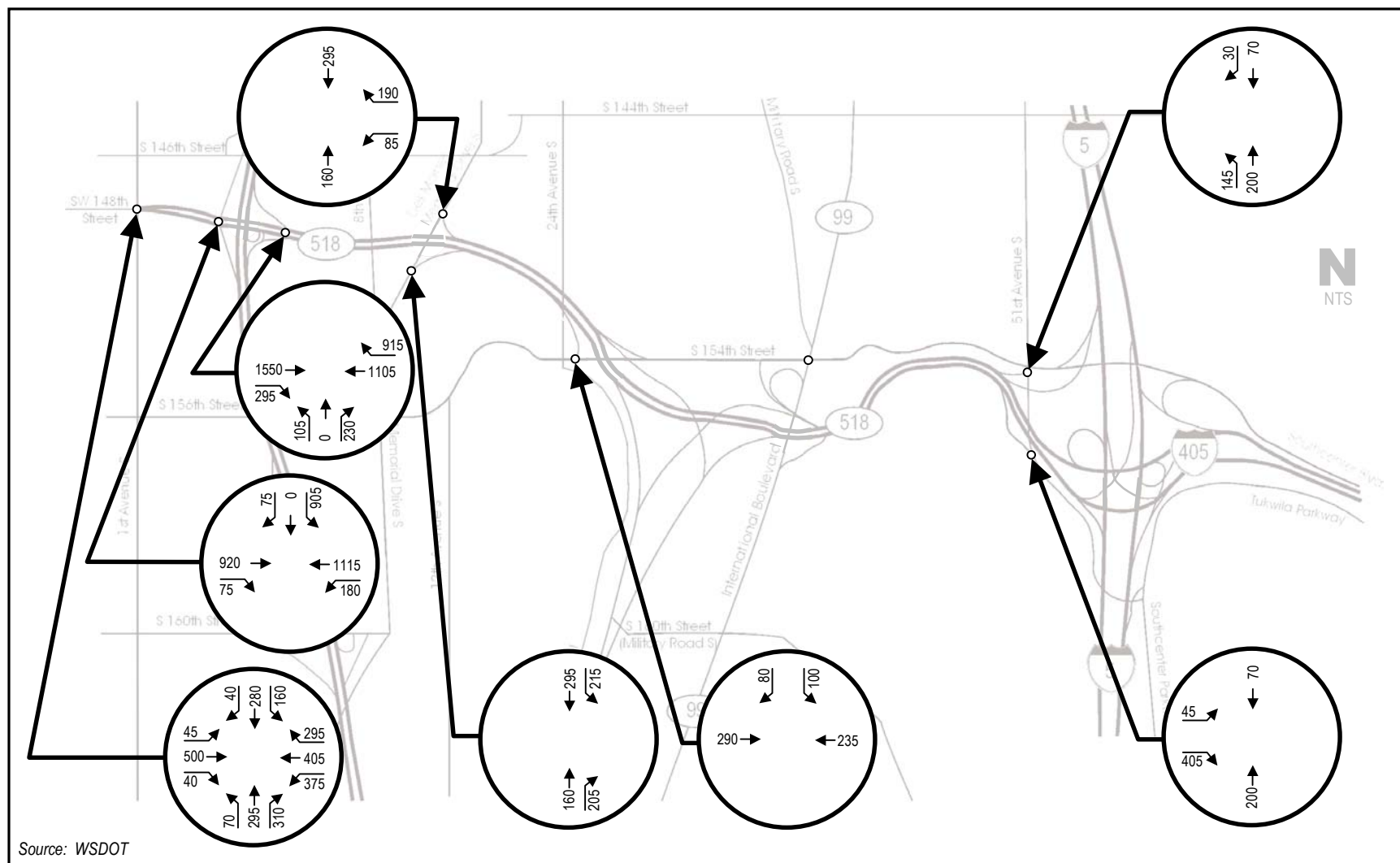
**Figure B.15**  
**Existing AM Peak Hour Ramp and Freeway Volumes**



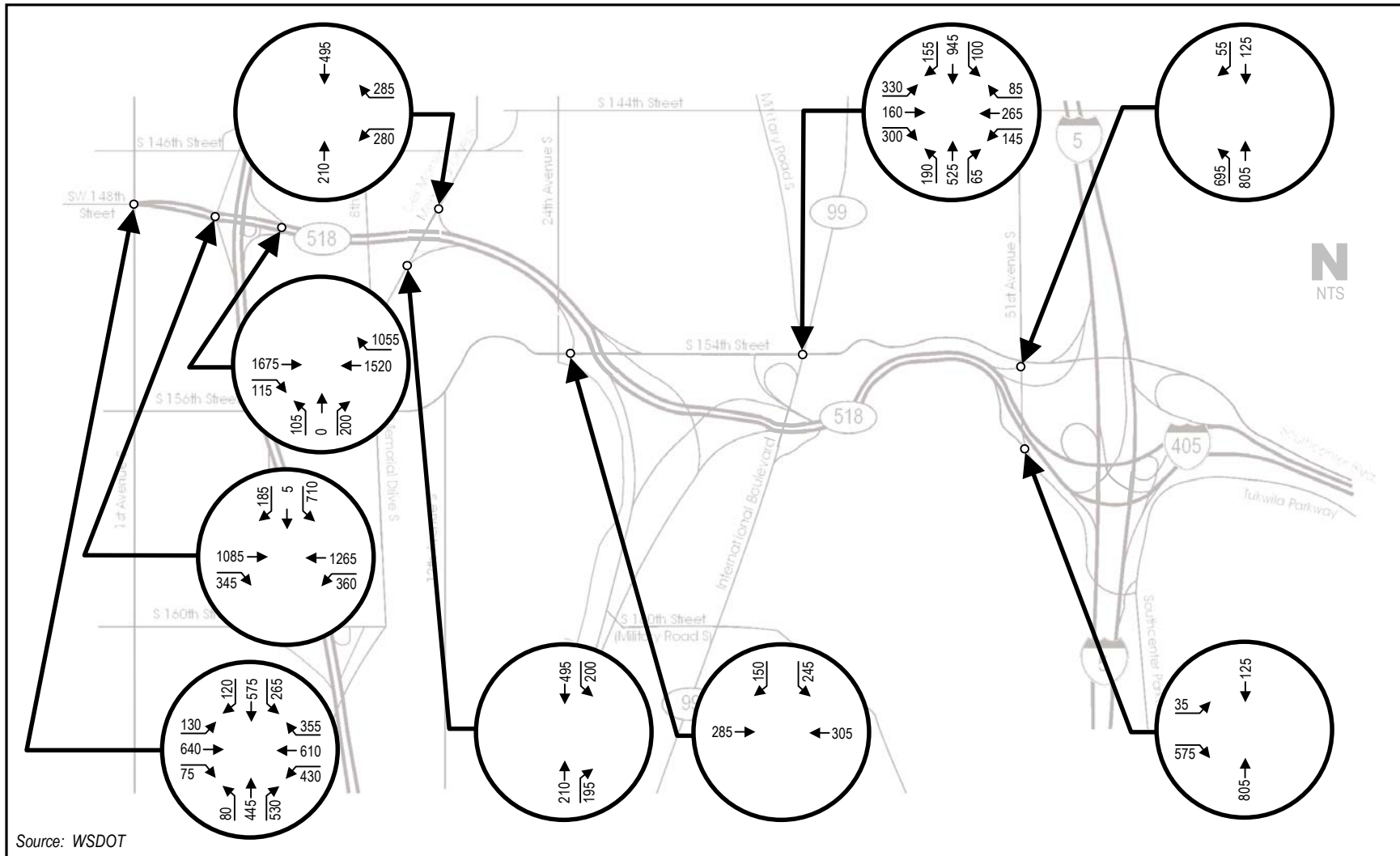
**Figure B.16**  
**Existing PM Peak Hour Ramp and Freeway Volumes**



**Figure B.17**  
**Existing Arterial Intersection Turning Movement Volumes – AM Peak Hour**



**Figure B.18**  
**Existing Arterial Intersection Turning Movement Volumes – PM Peak Hour**



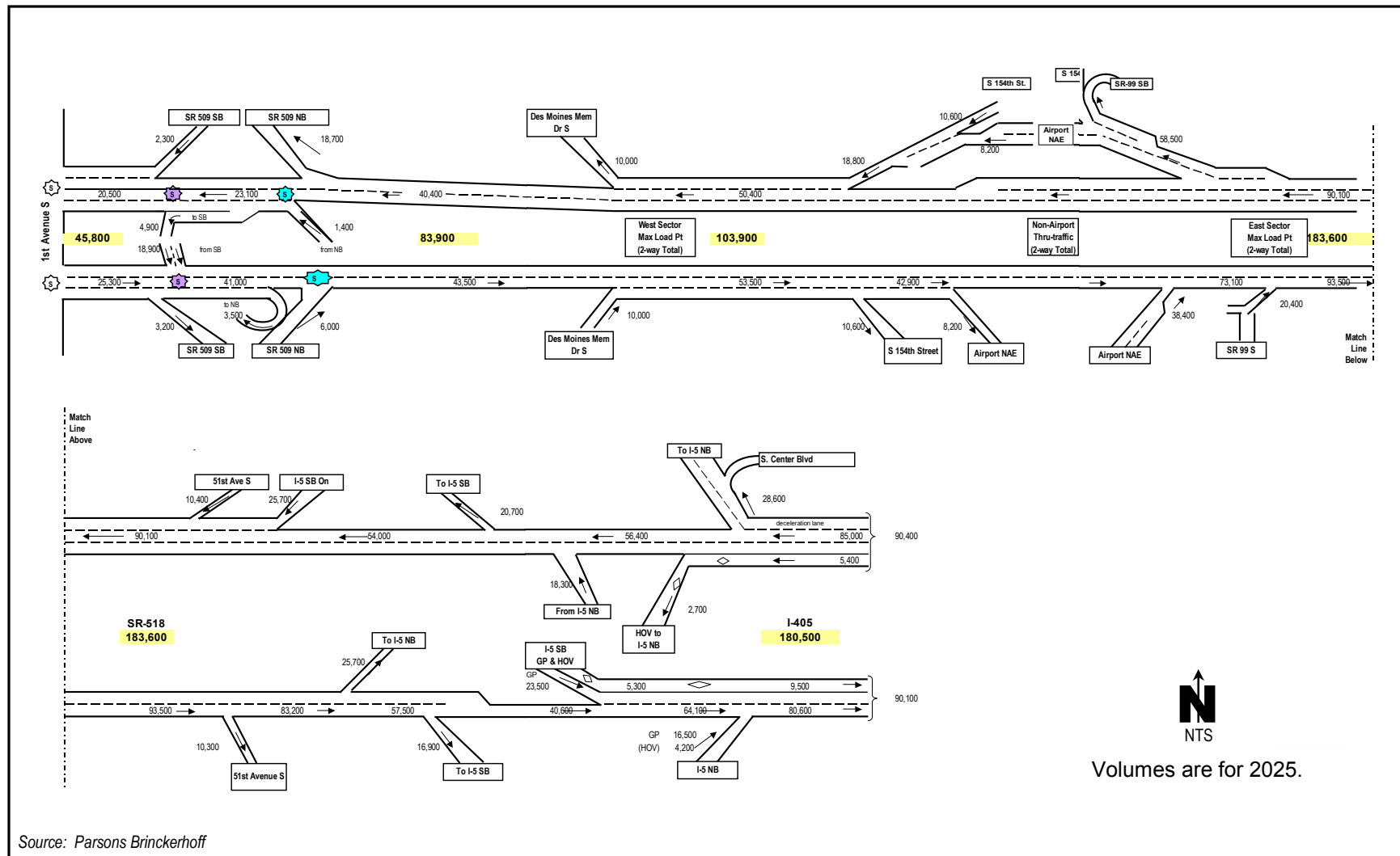


**APPENDIX C:**

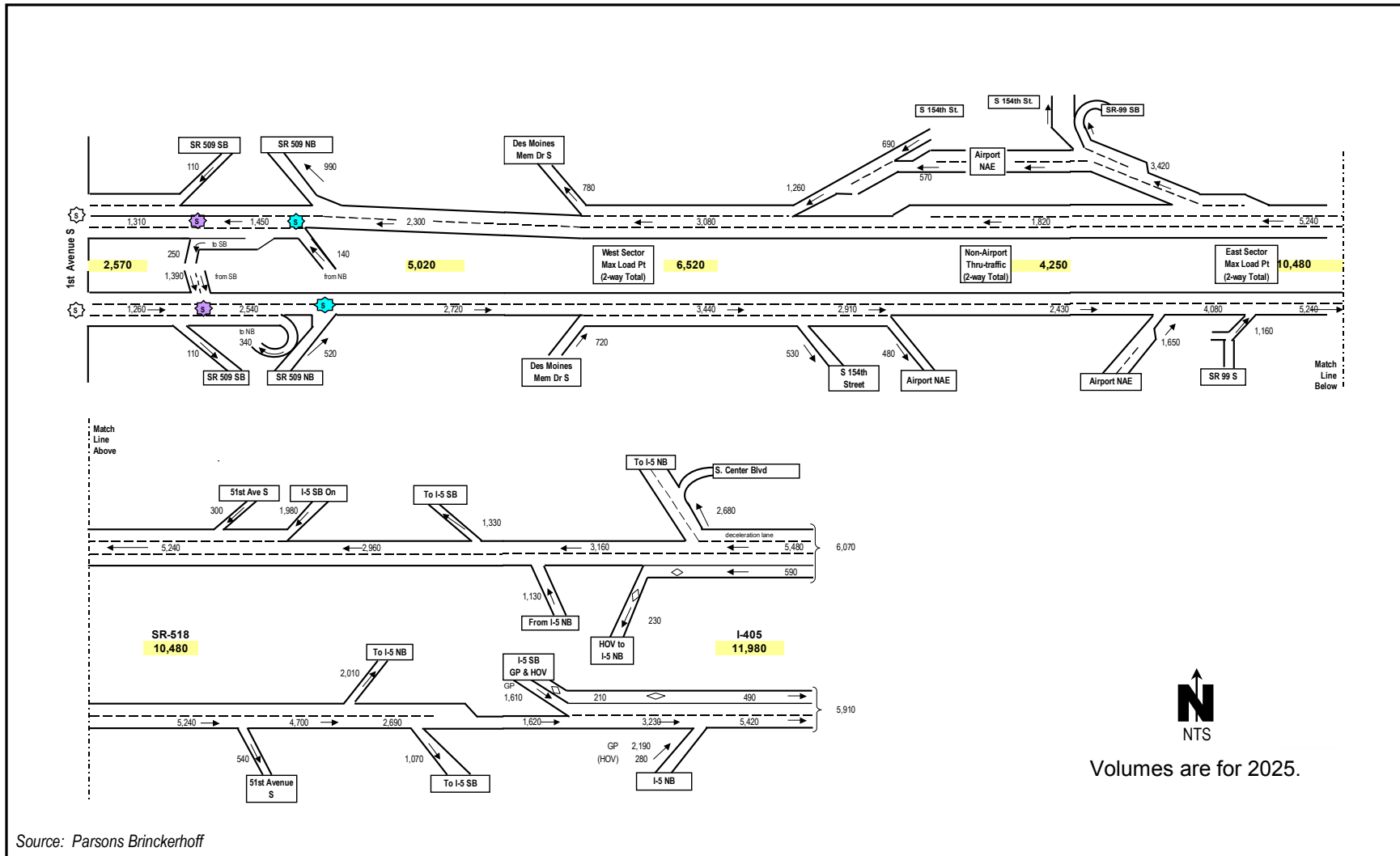
**FUTURE CONDITIONS**

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### Future Baseline Average Weekday Ramp and Freeway Volumes No Action

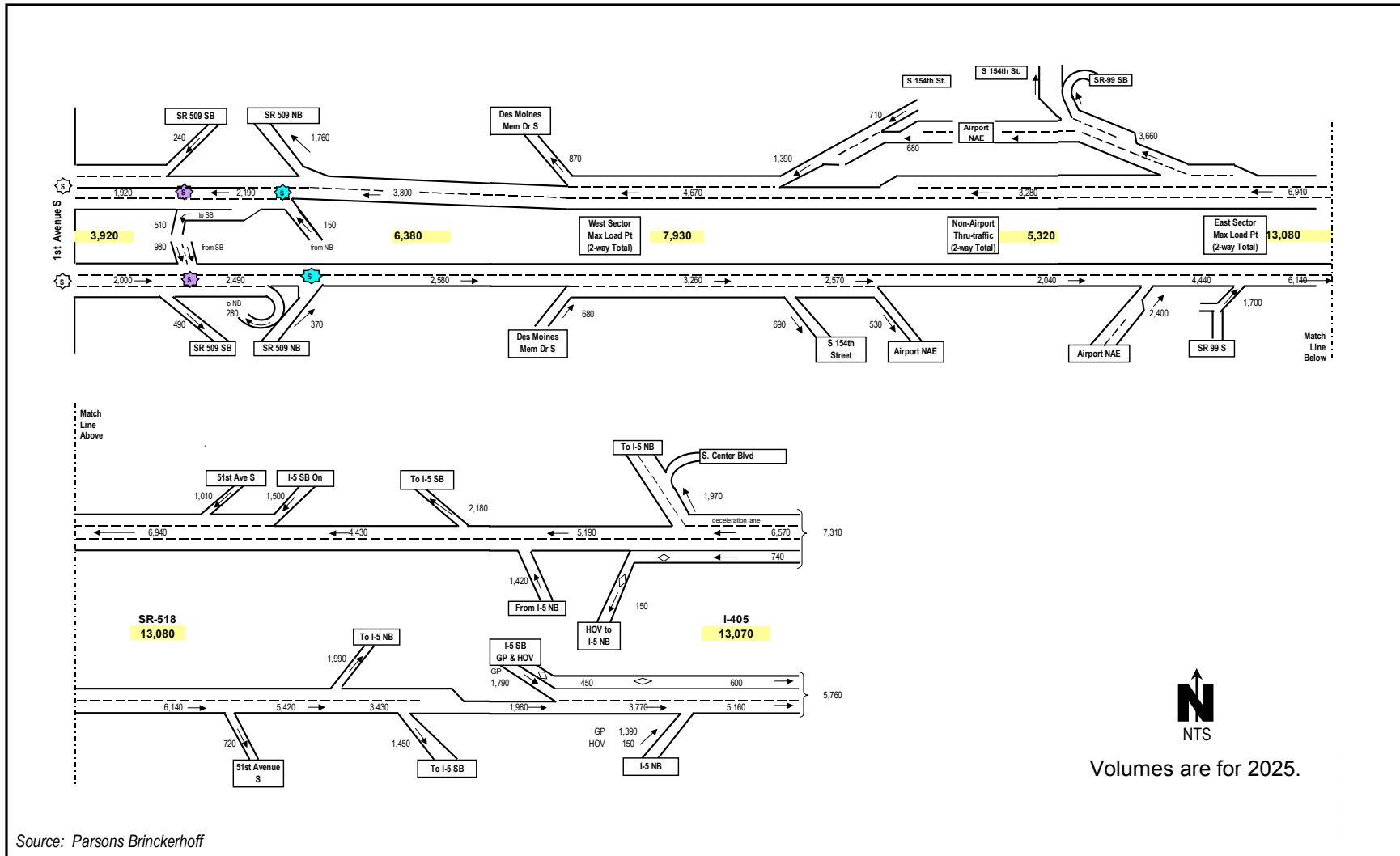


**Figure C.2**  
**Future Baseline AM Peak Hour Ramp and Freeway Volumes**  
**No Action**



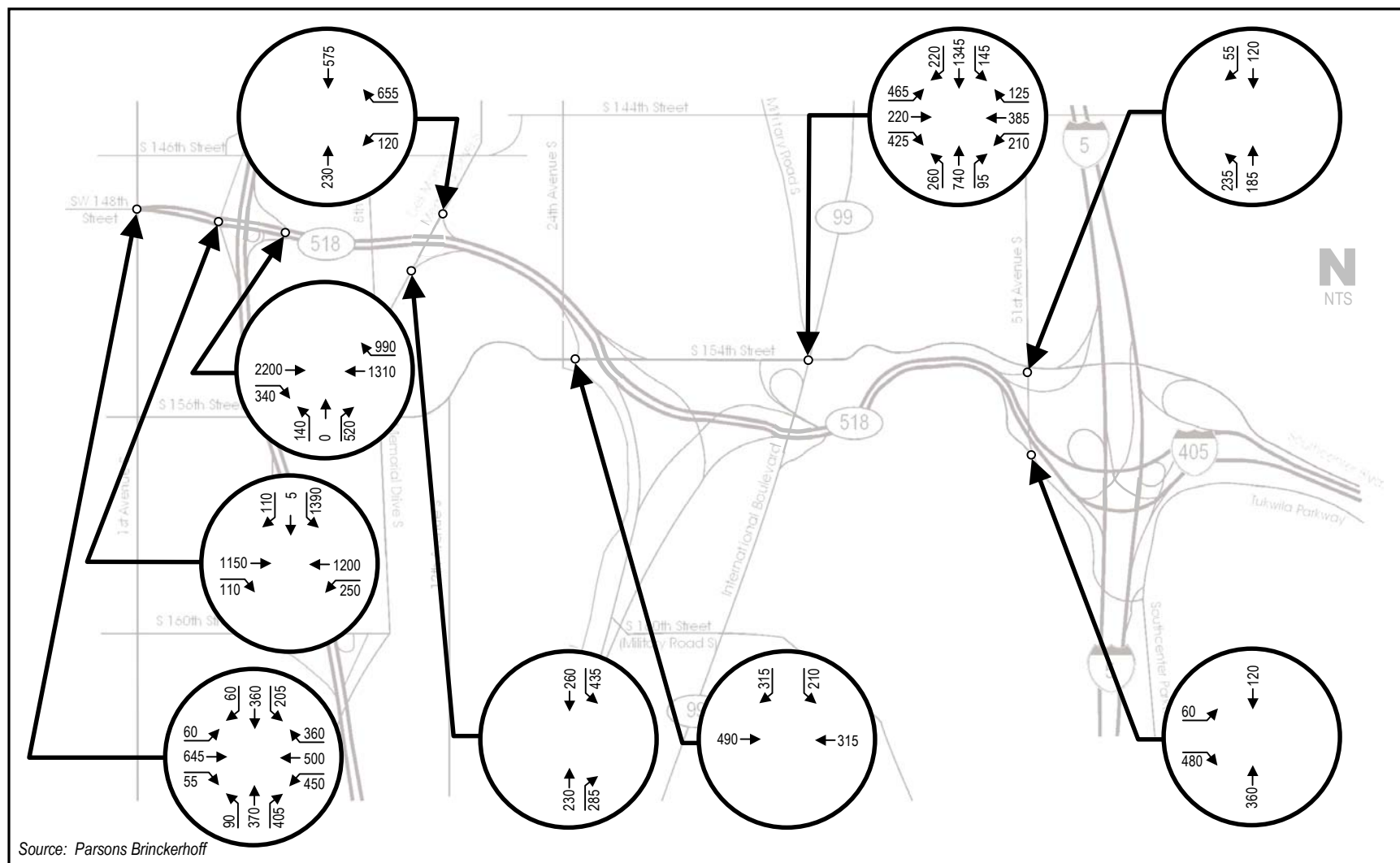
Source: Parsons Brinckerhoff

**Figure C.3**  
**Future Baseline PM Peak Hour Ramp and Freeway Volumes**  
**No Action**

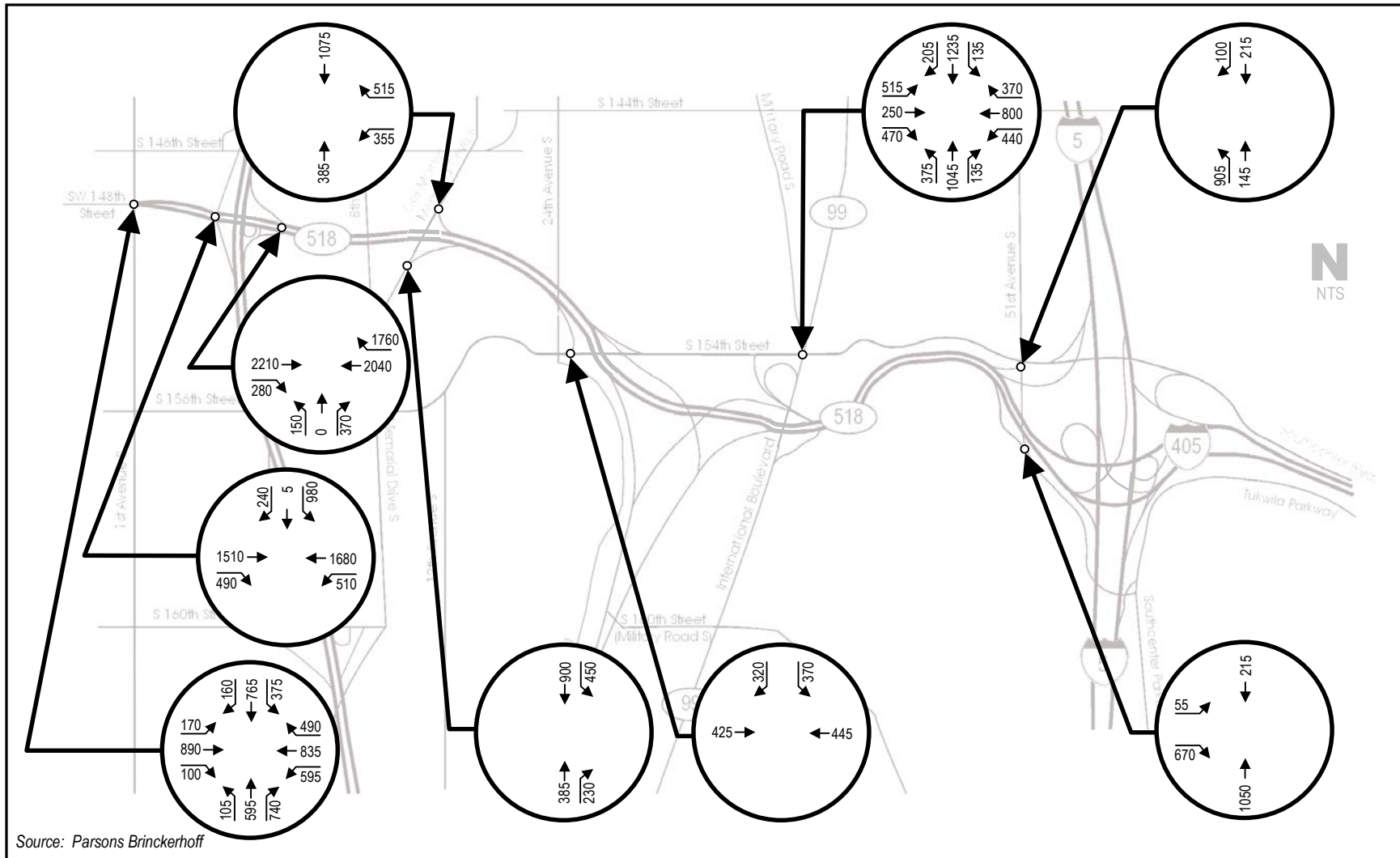


Source: Parsons Brinckerhoff

**Figure C.4**  
**Future Baseline Arterial Intersection Turning Movement Volumes**  
**No Action – AM Peak Hour**



**Figure C.5**  
**Future Baseline Arterial Intersection Turning Movement Volumes**  
**No Action – PM Peak Hour**





## **APPENDIX D:**

## **CONCEPT SCREENING**

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## **D.1 INTERCHANGE CONCEPTS**

### **D.1.1 SR 509 Interchange**

#### ***D.1.1.1 CONCEPTS CONSIDERED***

Four basic concepts for the SR 509 interchange were developed and taken through the screening process. These concepts were:

- **No Action Concept:** Maintain existing configuration, a diamond interchange with an EB to NB loop ramp. The current configuration does not accommodate freeway-to-freeway movements directly. Instead, SR-518 abruptly transitions to an arterial at the interchange, with signalized intersections at the two ramp terminals.
- **Concept 1 - Single Point Urban Interchange (SPUI):** Modify the diamond interchange to a single point urban interchange (SPUI). This would reduce the number of intersections on SR 518 from two to one, and further separate the interchange from the adjacent intersection of 1<sup>st</sup> Avenue S and S 148<sup>th</sup> Street.
- **Concept 2 - Direct Connect Ramps (SB to EB, WB to SB) with Diamond:** Addition of freeway-to-freeway direct connection ramps from SB SR 509 to EB SR 518 and from WB SR 518 to SB SR 509. These would be added in addition to minor modifications to the existing interchange to form a full diamond (replacing the loop ramp with a NB diamond ramp), which would continue to handle local trips to/from Burien.
- **Concept 3 - Direct Connect Ramp (SB to EB) with SPUI:** The SB to EB direct freeway-to-freeway ramps could also be developed around a modified SPUI interchange (rather than the existing diamond), with the SPUI handling local movements.

These four concepts are discussed in detail in Section VI.

#### ***D.1.1.2 CONCEPT CHARACTERISTICS***

##### ***No Action Concept***

##### **Advantages**

- No investment (beyond maintenance needs) is necessary to maintain existing interchange.
- Low impacts to existing environmental constraints (i.e., no construction required).
- Selection of the No-Build as part of the route development plan preserves the ability to accommodate future modifications to the interchange, should the need for such improvement be identified subsequent to the implementation of the RDP.

## **Disadvantages**

- Signalized intersections at 1<sup>st</sup> Avenue S and ramp termini would be expected to operate at poor levels of service (LOS D-F). Operational problems will be compounded due to their close proximity.
- Existing diamond design does not provide balanced freeway-to-freeway connections. Given the evolving nature of SR 509 as a potential regional north-south link to I-5, freeway-to-freeway connections are desirable for all primary movements.
- The current two-signal configuration (at the ramp termini) requires five total phases to serve all movements.
- The existing diamond, with two signalized intersections, plus the additional signal at 1st Avenue S, limit the ability to develop a gateway concept on the approach to the City of Burien. It also provides limited storage area, resulting in queuing and blocking problems.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

## ***Concept 1 - Single Point Urban Interchange (SPUI)***

### **Advantages**

- A SPUI results in a lower cost option than full freeway-to-freeway connections.
- A SPUI reduces the number of signals from three to two (including the intersection at 1<sup>st</sup> Avenue S). Such a design would allow reduction of two phases of traffic control to a three-phase signalized intersection through the interchange for local trips. It would also reduce interchange complexity.
- The SPUI can adequately serve 2025 forecast traffic volumes (with the assumption that SR 509 and the south airport access are completed).
- A SPUI increases distance between remaining signals, providing additional vehicle storage.
- A SPUI does not preclude the future introduction of freeway-to-freeway connections if those connections are accounted for during design.
- Few environmental constraints are identified within the SR 509 interchange. Impacts to the natural environment as well as to the surrounding community are anticipated to be low. Implementation could provide opportunity to enhance the environmental character of the interchange with increased landscaping, drainage improvements, and air quality improvements due to reduced idling at intersections.
- The need for additional right-of-way is not anticipated with the SPUI design.
- While the new interchange design itself would not improve nonmotorized mobility, any interchange rebuild could provide an opportunity to improve pedestrian and bicycle

movements through development of supplemental facilities concurrent with the implementation of the interchange improvement.

- The SPUI design improves the opportunity for an expanded gateway concept by reducing the number of intersections, and by increasing the distance to the remaining intersection at 1<sup>st</sup> Avenue S and Burien's arterial network. This would provide additional room for architectural features within the interchange to enhance the gateway concept.

### **Disadvantages**

- Requires financial commitment and independent environmental analysis/documentation to implement. This effort could be conducted independently, or teamed with other anticipated improvements in the SR 509 corridor.
- While the capacity of a SPUI is sufficient to adequately serve forecasted traffic volumes, a SPUI would not provide direct freeway-to-freeway connections. The interchange would still require that the primary freeway-to-freeway movement - SB to EB - continue to utilize a signalized intersection.
- SPUI designs are not common in the Puget Sound Region. Although they have been shown to be safe and efficient in many locations around the United States, there is a lack of local experience with SPUI operations from the perspective of driver expectation.
- The SPUI requires substantial investment, yet still relies on a signalized, at-grade intersection to accommodate at freeway-to-freeway movements. A retrofit of the existing overpass to accommodate the SPUI (rather than full new construction) would reduce costs, but is likely not feasible.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation. Completion of the No Action Plus scenario improvements (extension of SR 509 and South Airport Access) is recommended, however.

### ***Concept 2 - Direct Ramps with Diamond***

#### **Advantages**

- Provides freeway-to-freeway connections consistent with the regional network.
- Could be constructed incrementally as demand warrants. Initial analyses indicate that with the introduction of a south airport access via the SR 509 extension, a WB to SB direct ramp may not be needed within the 2025 timeframe of the proposed RDP. It could be staged at a later date.
- Local movements to and from Burien could be maintained via the existing diamond interchange.
- The added freeway-to-freeway ramps could be constructed with the SB- to EB ramp passing either under SR 518 and SR 509, or under SR 518 and over SR 509 (at a height close to that of the existing SR 518 bridge), and the WB to SB ramp constructed as a fly-

over (if warranted). This would minimize the visual impacts of the interchange on the surrounding community .

- A SB to EB tunnel ramp would maintain the ability to enhance the Burien gateway concept, allowing some flexibility to minimize the impacts of the remaining fly-over ramp configuration.

### **Disadvantages**

- Cost. Addition of both flyover ramps is anticipated to be more costly than construction of a SPUI. Construction of the tunnel ramp could increase the overall cost of the interchange as compared to a design with both ramps constructed as fly-overs.
- Ramping for the S 146<sup>th</sup> Street half diamond on SR 509 that lies just to the north of the SR 509/518 interchange may require reconfiguration to implement a SB to EB ramp into the overall interchange configuration. This could increase both costs and potential impacts to the surrounding community.
- Addition of one or both of these direct connect ramps as fly-over ramps could negatively impact gateway enhancement opportunities for the City of Burien.
- Implementation of direct connect ramps would require acquisition of additional right-of-way. This would likely result in displacement impacts to some residential and commercial land uses immediately adjacent to the existing interchange. This is primarily due to the existing narrow corridor right-of-way, close proximity of residential land uses in the southeast quadrant, and commercial land uses in the northwest and southwest quadrants of the existing interchange.
- Full freeway-to-freeway connections could result in excess capacity being provided for some movements at a relatively high cost. For example, the SB to EB movement is anticipated to far out-pace the WB to SB movement. Under the assumption that south access to the airport is achieved, demand for the WB to SB movement is estimated at 1900 vehicles per day; the demand for the SB to EB movement is estimated at 14,000 vehicles per day. Analysis suggests that the WB to SB movement could be adequately handled through the existing intersection(s). If planned during initial design of the south to EB ramp, a WB to south ramp could be phased further in the future, should demand grow to warrant that connection.

### **Meeting of Purpose, Need, and Goals**

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

### ***Concept 3 - Direct Ramp with SPUI***

#### **Advantages**

- Provides SB-EB freeway-to-freeway connections consistent with the regional network.
- Could be constructed incrementally as demand warrants.

- Local movements to and from Burien could be improved through a modified SPUI design underneath (or above) the direct connect ramps.
- The added freeway-to-freeway ramp could be constructed with the SB to EB ramp passing either under SR 518 and SR 509, or under SR 518 and over SR 509 (at a height close to that of the existing SR 518 bridge). Either would maintain the possibility of adding a WB to SB ramp as a fly-over in the future, should demand warrant.
- A SB to EB tunnel ramp would maintain the ability to enhance the Burien gateway concept, allowing some flexibility to minimize the impacts of the remaining fly-over ramp configuration.

### **Disadvantages**

- Ramping for the S 146<sup>th</sup> Street half diamond on SR 509 that lies just to the north of the SR 509/518 interchange may require reconfiguration to implement a SB to EB ramp into the overall interchange configuration. This could increase both costs and potential impacts to the surrounding community.
- Implementation of a direct connect ramps would require acquisition of additional right-of-way. This would likely result in displacement impacts to some residential and commercial land uses immediately adjacent to the existing interchange. This is primarily due to the existing narrow corridor right-of-way, close proximity of residential land uses in the southeast quadrant, and commercial land uses in the northwest and southwest quadrants of the existing interchange.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

#### ***D.1.1.3 CONCEPT SCREENING***

The concepts were screened against the evaluation criteria discussed in section VI. This process is summarized and presented in a screening matrix which is presented on the following pages.





#### ***D.1.1.4 RECOMMENDED CONCEPT FOR THE SR 509 INTERCHANGE***

Recommendations are presented in Section VI.



**Objective 1** Improve mobility and accessibility along the SR 518 corridor and improve connections to the local street system and regional highway and transportation network.  
Accommodate near and long-term (2025) travel demand within the SR 518 Corridor.





## Ability to Meet Criteria

Criteria	Concept:	No Build	(SPUI) Single Point Urban Interchange	Diamond W/ Direct Connectors	SPUI W/ Direct Connectors
Allows for future modifications to meet travel needs through and beyond 2025 (to build out).		Yes	Yes	Yes	Yes
Provides/Enhances freight connections to and mobility through the corridor.		No	Somewhat	Yes	Yes
Establishes clear travel routes. Directs trips onto appropriate roadway facilities.		No	Somewhat	Yes	Yes
Meets projected peak-hour demand for travel on SR 518.		No	Somewhat	Yes	Yes
Limits travel delay.		Somewhat	Somewhat	Yes	Yes
Supports transit service and improves transit connections.		Somewhat	Somewhat	Yes	Yes
Facilitates HOV use in corridor.		No	No	Somewhat	Somewhat
<b>Overall Rating - Objective 1</b>					





Notes: This interchange provides for both local access to Burien and regional movements. A revised interchange in this area should address these two very different movement needs independently. An approach that separates the local and regional movements can improve speeds, reduce delay, assure that local trips are assigned to the appropriate roadway types, and potentially reduces accidents.

**Objective 2** Avoid or minimize detrimental effects to the natural and build environments. Provide options that allow mitigation of unavoidable impacts.





## Ability to Meet Criteria

Criteria	Concept:			
	No Build	(SPUI) Single Point Urban Interchange	Diamond W/ Direct Connectors	SPUI W/ Direct Connectors
Concept does not result in known fatal flaws (environmental or constructability).	Yes	Yes	Yes	Yes
Impacts to the natural environment appear avoidable and/or can likely be adequately mitigated?	Yes	Yes	Yes	Yes
Impacts to the built environment appear avoidable and/or can likely be adequately mitigated?	Yes	Yes	Yes	Yes
<b>Overall Rating - Objective 2</b>				

**Objective 3** Improves the safety characteristics of the corridor

Ability to Meet Criteria					
Criteria	Concept:	No Build	(SPUI) Single Point Urban Interchange	Diamond W/ Direct Connectors	SPUI W/ Direct Connectors
	Concept supports WSDOT design standards and policies.	No	Somewhat	Yes	Yes
	Concept minimizes potential vehicle conflict points.	No	Somewhat	Yes	Yes
	Overall Rating - Objective 3				























**Objective 4** Provide compatibility with relevant plans and proposed projects established by neighboring agencies

Ability to Meet Criteria					
Criteria	Concept:	No Build	(SPUI) Single Point Urban Interchange	Diamond W/ Direct Connectors	SPUI W/ Direct Connectors
	Concept is, or is likely to be, compatible with plans and programs on-going within the area.	Somewhat	Yes	Yes	Yes
	Implementation of the concept would not preclude other planned transportation improvements.	Yes	Yes	Yes	Yes
	Overall Rating - Objective 4				




**Objective 5** Establish a plan that allows phasing of environmental analysis, funding, and construction of elements.

Ability to Meet Criteria					
Criteria	Concept:	No Build	(SPUI) Single Point Urban Interchange	Diamond W/ Direct Connectors	SPUI W/ Direct Connectors
	Concepts can be identified as a series of individual projects having independent utility. Concept may be phased if necessary.				
		Yes	Yes	Yes	Yes
Overall Rating - Objective 5		●	●	●	●

## Ability to Meet Criteria

Concept:	No Build	(SPUI) Single Point Urban Interchange	Diamond W/ Direct Connectors	SPUI W/ Direct Connectors
Objective 1 - Mobility and Accessibility				
Objective 2 - Impacts				
Objective 3 - Safety				
Objective 4 - Compatibility				
Objective 5 - Phasability				
<b>Interchange Recommendation</b>				

Key:

-  Does not meet objective
-  Partially meets objective
-  Meets objective



## **D.1.2 Des Moines Memorial Drive Interchange**

### ***D.1.2.1 CONCEPTS CONSIDERED***

Four interchange concepts were developed for the DMMD interchange. They include:

- **No Action:** Maintain existing configuration, a half diamond interchange with access to and from the east.
- **Concept 1 - Interchange Removal:** Complete removal of the existing interchange.
- **Concept 2 - Full Access (Diamond):** Provide full access by constructing ramps to and from the west to complete a full diamond interchange.
- **Concept 3 - Full Access (Loop Ramp):** Provide full access by constructing a  $\frac{3}{4}$  diamond with a NB to EB loop ramp in the northwest quadrant.

These concepts are discussed in detail in section VI.

Analysis results from the screening process resulting in the above recommendation are presented below. Results are presented qualitatively and are described as advantages and disadvantages.

#### ***No Action Concept***

##### **Advantages**

- No investment (beyond maintenance needs) is necessary to maintain existing interchange.
- Maintaining the No Action avoids impacts to identified wetlands as well as to adjacent residential and commercial land uses near the DMMD interchange.
- Improvements intended to serve areas north of SR 518 could instead be implemented at the 24th Avenue S/S154 Street interchange, an area of fewer environmentally sensitive constraints and potentially fewer impacts.
- The No-Build provides acceptable levels of service through the end of the 2025 RDP planning horizon, assuming improved access to emerging commercial and airport-related activities can be accommodated through the 24th Avenue S/S154 Street interchange. Anticipated 2025 levels of service are LOS B for both the WB off-ramp and EB on-ramp, with the signalized intersections at ramp termini operating at LOS C or better. Adjacent mainline segments operate at LOS D or better during the peak periods.
- Maintaining the No-Build would preserve access to surrounding residential and light commercial land uses. It could serve as a limited access to the emerging commercial and airport-related activities to the north of the existing airport runways.
- Maintaining the No-Build would avoid construction of additional infrastructure within the FAA CAA Zone.

- Selection of the No-Build as part of the route development plan preserves the ability to accommodate future modifications to the interchange, should the need for such improvement be identified subsequent to the implementation of the RDP.

### **Disadvantages**

- Selection of the No-Build as part of the RDP would not fully serve expanding commercial and warehouse activities proposed for north of SR 518. However, this would only be a disadvantage if access improvements at 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street are not implemented.
- The existing half diamond does not provide fully directional access to SR 518. Access to the west must be achieved via S 146<sup>th</sup> Street, Des Moines Memorial Drive, or S 156<sup>th</sup> Street. These alternate corridors provide sufficient arterial capacity to meet current and anticipated trips from the neighborhoods immediately surrounding the DMMD interchange, as long as alternate access is provided.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

### ***Concept 1 - Interchange Removal***

#### **Advantages**

- Removal of access would modestly simplify the SR 518 network of interchanges and concentrate access movements to fewer interchanges.
- Removal of access would reduce the number of intersections along DMMD, possibly reducing arterial delay and any collisions at these two locations. However, arterial delay along DMMD has not been identified as a problem by the community or by the traffic analysis conducted for this study. Neither of the ramp intersections are presently signalized, although the north intersection is identified as a candidate for signalization under the City of SeaTac Six-Year Transportation Improvement Plan.
- Removing access preserves DMMD as a residentially-focused arterial, in much the same way the No Action concept would.

#### **Disadvantages**

- The cost of removing the existing access could be difficult to justify, especially given that the existing interchange is not anticipated to contribute to negative operational impacts within the time horizon of the RDP.
- Removing existing access would reduce network connectivity to existing commercial and residential land uses dependent on the existing partial access. Impacts to dependent commercial activities could result in a loss of revenue, and ultimately impact the tax base, of the surrounding municipality. This would hold true even if the access were replaced with improvements to the 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street interchange due to a lack of connectivity between the two locations.

- The current partial interchange at DMMD allows one lane on SR 518 to be dropped, reducing the overall cross-section from 3 to 2 lanes headed WB. Likewise, the interchange provides an opportunity to add a lane in the EB direction. These lanes are critical to facilitate airport access and egress to and from the east. Removal of access at DMMD would require these lanes to be extended to the west to the next available on- and off-ramps, located in the SR 509 interchange. This would be anticipated to increase the overall impacts to the surrounding land uses and environmental constraints within the western portion of the corridor, and greatly increase costs.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, but would affect them two adjacent interchanges. Would require both improvements at the 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street interchange as well as extension of additional mainline lane west to the SR 509 Interchange.

## **Concept 2 - Full Access (Diamond)**

### **Advantages**

- Completing the DMMD interchange would provide full directional access, potentially negating or reducing the need for improved access at the 24th Avenue S/S 154th Street Interchange.

### **Disadvantages**

- Addition of full access at DMMD would result in physical and operation impacts to the ramps at the SR 509 interchange due to close proximity (0.5 mile) of the two interchanges.
- Construction of the new ramps could result in substantially higher impacts to slopes on the north side of SR 518, as well as residential land uses on both sides of the current alignment.
- All improvements would be within the FAA designated CAA zone. Improvements at the interchange would concentrate movements, vehicles, and people within a zone where such activity-concentrating is not preferred.
- Improvements at the DMMD interchange would result in potential impacts to wetlands in the Miller Creek Basin. Run-off from the improvements and existing facility would require accommodation within the Miller Creek watershed.
- Potential residential and commercial impacts to surrounding land uses could result in displacements.
- Demand for access (particularly to/from the west) at the interchange is not anticipated to be critical, since local trips could more suitably access the area using arterial connections, and further land use development in the area is somewhat limited by the Sea-Tac airport boundary and FAA flight protection zones. Using DMMD to provide access to expanded commercial and warehouse activities to the north of SR 518 would be circuitous compared to access at the 24th Avenue S/S 154th Street interchange. Addition of frontage roads and improved arterials would be required to take full advantage of improved access. These secondary improvements could result in

environmental and community impacts away from the immediate interchange, as well as substantially increased costs.

- Construction of additional ramps, as well as any widening of DMMD that might occur subsequent to improvements at the interchange, could have a detrimental impact on the historic and scenic landscaping established along the arterial.

**Independent Utility:** Would affect ability to complete improvements at SR 509. Does not require other improvements for its implementation.

### ***Concept 3 - Full Access (Loop)***

#### **Advantages**

- Completing the DMMD interchange would provide full directional access, potentially negating or reducing the need for improved access at the 24th Avenue S/S 154th Street Interchange.
- Concept would have somewhat less impact in the WB direction to the SR 509 interchange than concept 2. Physical impacts in the WB directions could be avoided, and operational impacts reduced, compared to concept 2.

#### **Disadvantages**

- Same as concept 3.

**Independent Utility:** Would affect ability to complete improvements at SR 509. Does not require other improvements for its implementation.

### ***D.1.2.2 CONCEPT SCREENING***





The concepts were screened against the evaluation criteria discussed in section VI. This process is summarized and presented in a screening matrix which is presented on the following pages.

### ***D.1.2.3 RECOMMENDED CONCEPT FOR THE DES MOINES MEMORIAL DRIVE INTERCHANGE***

Recommendations are presented in Section VI.





**Objective 1** Improve mobility and accessibility along the SR 518 corridor and improve connections to the local street system and regional highway and transportation network.  
Accommodate near and long-term (2025) travel demand within the SR 518 Corridor.

## Ability to Meet Criteria

Criteria	Concept:	No Action	Interchange Removal	Full Access	Full Access with loop
Allows for future modifications to meet travel needs through and beyond 2025 (to build out).		Yes	No	Yes	Yes
Provides/Enhances freight connections to and mobility through the corridor.		Somewhat	No	Yes	Yes
Establishes clear travel routes. Directs trips onto appropriate roadway facilities.		Somewhat	Somewhat	Yes	Yes
Meets projected peak-hour demand for travel on SR 518.		Yes	Yes	Yes	Yes
Limits travel delay.		Somewhat	No	Yes	Yes
Supports transit service and improves transit connections.		Somewhat	Somewhat	Somewhat	Somewhat
Facilitates HOV use in corridor.		Somewhat	Somewhat	Somewhat	Somewhat
<b>Overall Rating - Objective 1</b>					





**Objective 2** Avoid or minimize detrimental effects to the natural and build environments. Provide options that allow mitigation of unavoidable impacts.

## Ability to Meet Criteria





Criteria	Concept:	No Action	Interchange Removal	Full Access	Full Access with loop
Concept does not result in known fatal flaws (environmental or constructability).		Yes	Yes	No	Somewhat
Impacts to the natural environment appear avoidable and/or can likely be adequately mitigated?		Yes	Yes	Somewhat	Somewhat
Impacts to the built environment appear avoidable and/or can likely be adequately mitigated?		Yes	Yes	Somewhat	Somewhat
<b>Overall Rating - Objective 2</b>					



Objective 3   Improves the safety characteristics of the corridor					
Ability to Meet Criteria					
Criteria	Concept:	No Action	Interchange Removal	Full Access	Full Access with loop
Concept supports WSDOT design standards and policies.		Somewhat	Yes	No	Somewhat
Concept minimizes potential vehicle conflict points.		Yes	Somewhat	No	No
Overall Rating - Objective 3		<div></div>	<div></div>	<div></div>	<div></div>

Objective 4 Provide compatibility with relevant plans and proposed projects established by neighboring agencies					
Ability to Meet Criteria					
Criteria	Concept:	No Action	Interchange Removal	Full Access	Full Access with loop
Concept is, or is likely to be, compatible with plans and programs on-going within the area.		Somewhat	No	Somewhat	Somewhat
Implementation of the concept would not preclude other planned transportation improvements.		Yes	Yes	No	Somewhat
Overall Rating - Objective 4					






















**Objective 5** Establish a plan that allows phasing of environmental analysis, funding, and construction of elements.

Ability to Meet Criteria					
Criteria	Concept:	No Action	Interchange Removal	Full Access	Full Access with loop
Concepts can be identified as a series of individual projects having independent utility. Concept may be phased if necessary.		Yes	Somewhat	No	No
Overall Rating - Objective 5					

**Summary and Recommendation****Ability to Meet Criteria**

Concept:

No Action	Interchange Removal	Full Access	Full Access with loop
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Objective 1 - Mobility and Accessibility				
Objective 2 - Impacts				
Objective 3 - Safety				
Objective 4 - Compatibility				
Objective 5 - Phasability				
<b>Interchange Recommendation</b>				

Key:



Does not meet objective



Partially meets objective



Meets objective

## **D.1.3 24<sup>th</sup> Avenue S/S 154<sup>th</sup> Street/Airport/SR 99**

### **D.1.3.1 CONCEPTS CONSIDERED**

A wide range of initial concepts were developed for this interchange area in an effort to improve traffic circulation, minimize traffic and environmental impacts (arterial and freeway), and increase accessibility to surrounding land uses. This set of initial concepts was reviewed to gauge feasibility and potential constraints, traffic characteristics, and geometric considerations (including interchange spacing and added access). A refined set of concepts were developed that generally involved relocating the S 154<sup>th</sup> St ramps to 24<sup>th</sup> Ave S, reconfiguring the SR 99 ramps, and providing full access through frontage road connections between the sets of ramps. They include:

- **No Action Concept:** Maintain existing configuration.
- **Concept 1 - Split Diamond:** A split diamond interchange would provide full access through ramps to/from the west at 24<sup>th</sup> Ave S, and to/from the east at SR-99. One-way frontage roads would connect the two half interchanges.
- **Concept 2 - Combined SPUI and Half Diamond:** A full SPUI interchange at SR-99, and a half diamond interchange at 24<sup>th</sup> Ave S. Connecting ramps eliminate the need for added access directly to the mainline between 24<sup>th</sup> Ave S and SR-99. The EB merge of the onramp from 24<sup>th</sup> Ave S onto the NAE is problematic in terms of geometry, and requires that a third EB lane be constructed on SR-518.
- **Concept 3 - Split Diamond with Loop Ramp:** A combination split diamond interchange with a loop ramp at SR-99 would provide full access through ramps to/from the west at 24<sup>th</sup> Ave S, and to/from the east at SR-99. Frontage roads would connect the two half interchanges. The loop ramp from WB SR-518 to SB SR-99 would eliminate the need for an additional signal on SR-99.

These concepts are discussed in detail in Section VI.

### **No Action Concept**

#### **Advantages**

- No investment (beyond maintenance needs) is necessary to maintain existing interchange.
- Minimal impact to the existing environmental and built constraints.
- Does not preclude future introduction of alternate solutions. Local jurisdiction and Port of Seattle plans, which are evolving as this study is underway, could affect the desired approach at this interchange.

#### **Disadvantages**

- The current interchange configurations provide only indirect access to several heavy movements. WB SR 519 to NB SR 99, NB SR 99 to EB SR 518 (via 154<sup>th</sup> St), and access to WB SR 518 from 24<sup>th</sup> Ave S access are all achieved through indirect routing.

- Existing and forecast LOS at ramp terminals (at SR 99) and at the signalized intersections on SR 99 are at or near failure. Queuing on SR 99 is problematic as well.
- The current configuration contributes to poor operations at the SR 99/S 154<sup>th</sup> St intersection.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

### ***Concept 1 - Split Diamond***

#### **Advantages**

- Simple configuration would make implementation of the Split Diamond concept straightforward, and would result in direct, uncomplicated traffic routing.
- The Split Diamond concept is anticipated to cost less than other build concepts.
- Concept would have a small footprint, and would not be expected to significantly impact the natural environment.
- Airport bound and SR 99 bound would be better segregated, with clearer traffic routing, under the Split Diamond concept than under the No Action.
- Acceptable LOS is forecast for SR 99 and other affected arterials (actual LOS would vary by configuration, but analysis shows LOS of D or better could be achieved at all intersections).
- Would reduce traffic on 154<sup>th</sup> Ave S.
- Concept would provide improved access and operational characteristics over the No Action concept.

#### **Disadvantages**

- Concept would require some additional right-of-way, impacting some properties south of S 154<sup>th</sup> St as well as the Port of Seattle's property north of SR 518 and west of 24<sup>th</sup> Ave S.
- Less direct access to SR-99 and 24<sup>th</sup> Ave S (requires passing through additional intersections) than other build concepts.
- Traffic analysis shows split diamond would result in significant queuing and blocking problems on SR 99.
- Concept would require one additional lane compared to Concepts 2 and 3 on the SR 518 overpass to accommodate forecast traffic.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.



## **Concept 2 - Combined SPUI and Half Diamond**

### **Advantages**

- Concept would have a small footprint, and would not be expected to significantly impact the natural environment.
- Airport bound and SR 99 bound would be better segregated, with clearer traffic routing, under the Combined SPUI and Half Diamond concept than under the No Action.
- Acceptable LOS is forecast for SR 99 and other affected arterials (actual LOS would vary by configuration, but analysis shows LOS of D or better could be achieved at all intersections).
- Concept would reduce traffic on 154<sup>th</sup> Ave S.
- Concept would provide improved access and operational characteristics over the No Action Concept.
- Concept would require only one interchange-related signal on SR 99 (rather than two under Concept 1).
- Concept provides full access at SR 99 (the higher volume corridor). Full access at 24<sup>th</sup> Ave S could be provided by implementing the 2<sup>nd</sup> phase.
- SPUI configuration provides better storage for left turning movement queues at SR 99. Queuing and blocking are not anticipated to be nearly as problematic as under the No Action or Concept 1.

### **Disadvantages**

- Concept would be more costly than the other concepts considered.
- Through delay on SR 99 under forecast conditions is anticipated to be somewhat higher than for Concept 1 or 3 (though ramp delay is anticipated to be slightly lower).
- Full access not provided at SR 99 (under initial phase).
- Second phase would be dependant on the implementation of a third EB lane on SR 518 (Though this lane would benefit all concepts, it is only geometrically required to implement Concept 2, phase 2).

**Independent Utility:** Phase 1 does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation. Phase 2 is dependent on improvements to EB SR 518 (described under the Tukwila Interchange Improvements section).

## **Concept 3 - Split Diamond with Loop Ramp**

### **Advantages**

- Concept would have a small footprint, and would not be expected to significantly impact the natural environment.
- Acceptable LOS is forecast for SR 99 and other affected arterials (actual LOS would vary by configuration, but analysis shows LOS of D or better could be achieved at all intersections). Concept delivers good LOS and queuing analysis results.
- Concept would provide improved access and operational characteristics over the No Action Concept.
- Concept would require only one interchange-related signal on SR 99 (rather than two under Concept 1).
- Concept provides full access at 24<sup>th</sup> Ave S.
- Concept cost would be lower than either other build concepts.

#### **Disadvantages**

- Full access not provided at SR 99. Traffic destined for WB SR 518 would need to use S 154<sup>th</sup> to access the ramps at 24<sup>th</sup> Ave S.
- Concept does not segregate airport and SR 99 traffic as well as the other build concepts.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

#### ***D.1.3.2 CONCEPT SCREENING***





The concepts were screened against the evaluation criteria discussed in section VI. This process is summarized and presented in a screening matrix which is presented on the following pages.

#### ***D.1.3.3 RECOMMENDED CONCEPT FOR THE S 154<sup>TH</sup> STREET/AIRPORT/SR 99 INTERCHANGE***

Recommendations are presented in Section VI.





**Objective 1** Improve mobility and accessibility along the SR 518 corridor and improve connections to the local street system and regional highway and transportation network.  
Accommodate near and long-term (2025) travel demand within the SR 518 Corridor.

## Ability to Meet Criteria





Criteria	Concept:	No Action	Split Diamond	SPUI Phased	Diamond with Loop
Allows for future modifications to meet travel needs through and beyond 2025 (to build out).		Yes	Somewhat	Yes	Yes
Provides/Enhances freight connections to and mobility through the corridor.		No	Yes	Yes	Yes
Establishes clear travel routes. Directs trips onto appropriate roadway facilities.		No	Yes	Yes	Yes
Meets projected peak-hour demand for travel on SR 518.		No	No	Yes	Yes
Limits travel delay.		No	Somewhat	Somewhat	Somewhat
Supports transit service and improves transit connections.		No	Yes	Yes	Yes
Facilitates HOV use in corridor.		No	Somewhat	Somewhat	Somewhat
<b>Overall Rating - Objective 1</b>					

**Objective 2** Avoid or minimize detrimental effects to the natural and build environments. Provide options that allow mitigation of unavoidable impacts.

## Ability to Meet Criteria





Criteria	Concept:			
	No Action	Split Diamond	SPUI Phased	Diamond with Loop
Concept does not result in known fatal flaws (environmental or constructability).	Yes	Yes	Yes	Yes
Impacts to the natural environment appear avoidable and/or can likely be adequately mitigated?	Yes	Yes	Yes	Yes
Impacts to the built environment appear avoidable and/or can likely be adequately mitigated?	Yes	Yes	Yes	Yes
<b>Overall Rating - Objective 2</b>				

**Objective 3** Improves the safety characteristics of the corridor**Ability to Meet Criteria**

Criteria	Concept:			
	No Action	Split Diamond	SPUI Phased	Diamond with Loop
Concept supports WSDOT design standards and policies.	No	Yes	Yes	Yes
Concept minimizes potential vehicle conflict points.	No	Yes	Yes	Yes
<b>Overall Rating - Objective 3</b>				

**Objective 4** Provide compatibility with relevant plans and proposed projects established by neighboring agencies

## Ability to Meet Criteria

Criteria	Concept:			
	No Action	Split Diamond	SPUI Phased	Diamond with Loop
Concept is, or is likely to be, compatible with plans and programs on-going within the area.	No	Somewhat	Yes	Yes
Implementation of the concept would not preclude other planned transportation improvements.	Yes	Somewhat	Yes	Yes
<b>Overall Rating - Objective 4</b>				



**Objective 5** Establish a plan that allows phasing of environmental analysis, funding, and construction of elements.























## Ability to Meet Criteria

Criteria	Concept:			
	No Action	Split Diamond	SPUI Phased	Diamond with Loop
Concepts can be identified as a series of individual projects having independent utility. Concept may be phased if necessary.	Yes	Yes	Yes	Yes
<b>Overall Rating - Objective 5</b>	●	●	●	●

**Summary and Recommendation****Ability to Meet Criteria**

Concept:

No Action	Split Diamond	SPUI Phased	Diamond with Loop
-----------	---------------	-------------	-------------------

Objective 1 - Mobility and Accessibility				
Objective 2 - Impacts				
Objective 3 - Safety				
Objective 4 - Compatibility				
Objective 5 - Phasability				
<b>Interchange Recommendation</b>				

Key:



Does not meet objective



Partially meets objective



Meets objective

## **D.1.4 Tukwila Interchange**

### **D.1.4.1 CONCEPTS CONSIDERED**

Five interchange concepts were developed for the Tukwila interchange area. They include:

- **No Action Concept:** Maintain existing configuration.
- **Concept 1 - Continuation of 2<sup>nd</sup> EB Lane:** Extend a second EB lane through the interchange, where the mainline currently necks down to a single lane.
- **Concept 2 - Right-Side Ramp:** Convert the left-side exit to NB I-5 to a right-side exit. This concept could either create a single right side exit to I-5 north and south, or maintain the existing SB I-5 exit and construct a new I-5 NB exit prior.
- **Concept 3 - New 3<sup>rd</sup> Lane:** Addition of a third lane on the SR 518 EB alignment between the Airport and Tukwila interchanges.
- **Concept 4 - Two-Lane Ramps:** Addition ramp lanes to better accommodate demand and coordinate lane-balancing needs as envisioned under the I-405 corridor improvements.

These concepts are discussed in detail in section VI.

### **No Action Concept**

#### **Advantages**

- No investment (beyond maintenance needs) is necessary to maintain existing interchange. However, given the current congestion resulting from the interchange configuration, it would be difficult to identify the No Action as cost-effective.
- Maintaining the current physical configuration would not disturb adjacent wetlands and other natural environmental resources. No additional impact on the unstable soils immediately to the south of the SR 518 corridor would be realized. However, increasing congestion, as anticipated through the design year for the RDP, would likely lead to increased levels of air pollution from idling vehicles and other potential community impacts (i.e., loss of economic opportunity, loss of access due to congestion, reduced quality of life, etc.).
- Does not preclude future introduction of alternate solutions.

#### **Disadvantages**

- The current design of the Tukwila interchange treats the connection from SR 518 to I-405 as a single-lane ramp, when in actuality SR 518 operates as an extension of the I-405 corridor. This leads to a lack of continuity in the freeway system, a violation of driver expectation, and lane balancing problems through the interchange.
- The current single-lane EB connection between SR 518 and I-405 provides inadequate capacity to meet current and projected traffic flows. As described in the introduction,

dropping to a single lane has ramifications on operations on both sides of the interchange, and all the way back to the SR 99 and Airport interchanges.

- The EB to NB and WB to SB ramps will be inadequate to handle anticipated 2025 demand. The LOS for these ramps is forecasted to be F/F (AM/PM) and E/F, respectively. Two-lane ramps are required at a minimum to provide adequate capacity and/or storage for vehicles destined for I-5, as well as to balance mainline lanes (particularly in light of the proposed I-405 corridor improvements).
- The EB to NB left-hand ramp does not meet driver expectations. Drivers are accustomed to exits and entrances located on the right-hand side within fully access-managed freeway corridors within the State of Washington as well as nationally. Maintaining the existing left-hand exit would perpetuate a non-standard condition, which is compounded by the fact that 80% of the traffic is airport-related, many of whom could be unfamiliar with the local roadway layout. The left-hand exit and violation of driver expectation leads to safety concerns as well, given the difficulty of weaving to the left to access the ramps.
- Entering the Tukwila interchange EB, drivers are faced with several critical decision points within a short segment: move right to exit to 51<sup>st</sup> Avenue S, move left to exit to I-5 north, move right to exit to I-5 south, lane ends merge right, and EB I-405 with various merge operations on both sides in rapid succession. The No-Build does not address this situation.
- No-Build at the Tukwila interchange would preclude addition of a third EB mainline lane between the Airport and Tukwila interchanges. A third lane added to the outside of the SR 518 alignment would need to be dropped at one of the I-5 offramps to balance with the lane configuration on I-405, as well as because of geometric constraints crossing under the I-5 mainline. Additionally, demand between the I-5 offramps and I-405 does not warrant a third through-lane. The NB I-5 ramp, which experiences the highest volumes of the EB offramps near I-5, exits the roadway from the left side. A drop lane is not recommended for this left-side exit since it would conflict with WSDOT design standards specifying right-side exits. Additionally, such a configuration would result in only maintaining a single basic lane throughout the corridor (since the outside lane is added, and the inside lane dropped). The addition of a third lane while maintaining a left-hand exit to NB I-5 would also complicate the existing weave, forcing vehicles entering SR 518 at the Airport to weave across two lanes of traffic instead of one.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

### ***Concept 1 - Continuation of 2<sup>nd</sup> EB Lane***

#### **Advantages**

- Extension of a second EB lane on SR 518 through the Tukwila Interchange would provide immediate operational advantages over the existing lane configuration. Vehicles now lining up in the right hand lane to access both I-5 South and I-405 could be distributed over two lanes, providing a better traffic balance and making the traffic merge for vehicles coming from the Airport and destined for I-5 NB less difficult. It should also make the merge from I-5 NB easier in the near-term.

- Extension of the second lane would maintain lane balance through the interchange without the forced merge from two lanes down to one now applied to EB SR 518 traffic. This configuration can be accommodated directly into the proposed I-405 corridor improvements by moving the current add-lane at Andover Park W to the I-5 NB on-ramp. This would result in the interchange gaining three lanes from I-5 (two from the north and one from the south) plus two GP lanes continuing through from SR 518, for a total of five lanes.
- Extension of a second lane from SR 518 through the interchange provides a longer merge opportunity for traffic entering the corridor from I-5 NB. It would also provide less of a merge conflict when it does merge, since SR 518 traffic would now be distributed over two lanes.
- The additional lane could be implemented as a temporary, quick-fix, transportation systems management improvement, reducing the current traffic congestion now occurring within the interchange and potentially gaining public support for further long-term improvements within the corridor.
- The addition of a second lane through the interchange does not preclude improvements proposed under the I-405 corridor improvement program, and could easily be modified as part of that program to maintain a permanent second lane (to full standards) through the interchange. Both the temporary improvements, as well as a final permanent solution, would meet the goal identified by WSDOT of maintaining two basic lanes throughout the SR 518 corridor.

## **Disadvantages**

- Extension of a second lane poses potential impacts to the natural environment. A portion of Gilliam Creek lies immediately south of the NB to EB ramp, and is identified as the upper-most reach of the creek bearing fish habitat and potential endangered fish species. Improvements, both temporary and long-term, would likely require a BA and environmental checklist prior to implementation.
- Conversion of the existing shoulders as part of a temporary lane extension, albeit for a relatively short distance, presents potential safety concerns. Shoulders are intended to provide a locations for recovery and refuge during incident occurrences. A more detailed geometric analysis is required to determine the extent of shoulder loss through the proposed location to quantify the level of concern and the ability to develop appropriate mitigation.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

## ***Concept 2 - Right-Side Ramp***

### **Advantage**

- Moving the existing left-hand exit to the right side of SR 518 would better meet driver expectation, resulting in a less confusing connection to the regional freeway network.

- A right-side exit to I-5 would eliminate the mainline weave occurring between the Airport/SR 99 and Tukwila interchanges.
- A single right-hand exit to I-5 (NB and SB combined) would simplify the decision points along the corridor. A driver using the facility would (1) decide to exit to I-5, and (2) select NB or SB. This two-step decision would be simplified if the drop lane from SR 518 is made the choice lane for I-5 north or south, i.e., a driver in the drop lane from SR 518 would not need to switch lanes again, regardless of their destination. This compares to the decision sequence that exists today where the driver has to decide to (1) access I-5, (2) select north or south, and (3) decide which lane to use, and maneuver to that lane within a 0.9 mile distance.
- Right-hand exits meet the American Association of State Highway and Transportation Officials, WSDOT, and FHWA preferred configuration for freeway exits.
- Moving the existing left-hand exit to the right would improve the safety characteristics and LOS of the eastern EB portion of the corridor by removing an existing weave and reducing the number of conflict opportunities between crossing traffic.
- Conversion to a right-side ramp would allow the existing inside ramp to be considered for HOV direct access to the NB I-5 HOV lane. Should such a concept be allowed, it would likely require a very high occupancy (i.e., a 3+ or even a vanpool/ transit-only designation) restriction. This would be to ensure that the majority of traffic uses the new right-hand exit provided for GP use.
- Conversion to a right-side exit within the Tukwila Interchange can (and should) be staged to occur in coordination with the interchange reconfiguration that will be necessary for the proposed I-405 corridor expansion project.
- Conversion to a right-side exit assists in addressing lane balancing issues within the corridor. A right-side exit would require a new drop lane be added on SR 518 between the Airport onramp and the new right-side exit. This third lane is needed to address capacity problems on the EB mainline of SR 518, but cannot be added without significant impacts to operations (such as exacerbating the existing weave) until an option to drop the lane on the right-hand side can be established.

## **Disadvantages**

- The cost associated with implementing a right-side ramp would be relatively expensive due to the potential size of the structure required. However, structures of this magnitude are not uncommon on the interstate system. The existing structure connecting I-5 to SR 526 in Snohomish County is a local example.
- Environmental constraints are identified within the Tukwila interchange that would require detailed analysis during the preliminary engineering for a right-side ramp. These include unstable soils on the slope immediately adjacent to the south of the SR 518 alignment, as well as numerous wet soils and wetlands that are suspected of existing in this same area. However, initial analysis suggests that these would not preclude implementation of the recommended concepts.

- Currently, a ramp accessed off of Klickitat Drive connects Southcenter Mall traffic with the EB to SB ramp, just south of the main interchange area. Maintenance of this access point would be difficult if a single elevated ramp serving both I-5 NB and SB movements were to be implemented. A requirement to maintain this access might require independent exits from SR 518 for NB and SB traffic. Determination of the final configuration would be required through a preliminary engineering evaluation.
- Access at 51<sup>st</sup> Avenue South is currently provided from SR 518 EB and to SR 518 WB. This access point constrains the existing Tukwila interchange and would require coordination with this interchange concept.
- Potential Environmental Species Act issues related to the portion of Gilliam Creek in the southeast quadrant of the existing interchange will require accommodation in any future design.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

### ***Concept 3 - New 3<sup>rd</sup> Lane***

#### **Advantages**

- Provides opportunity to better meet the anticipated 2025 volumes in the eastern portion of the SR 518 corridor, resulting in a V/C ratio of 0.90, and an improvement in levels-of-service. Accommodates a high number of airport-related future trips.
- Provides improved connection to a proposed right-side I-5 exit.
- Provides lane balance within the corridor and facilitates movement of airport traffic from the North Airport Expressway ramp and SR 99 to I-5.
- Improves operations within the North Airport Expressway and SR 99 interchanges by reducing the delay of vehicles trying to merge into lanes that are already queuing for access to I-5. Addition of another lane to SR 518 would allow the two right-most lanes to provide access to the I-5 ramps (one drop ramp and one choice ramp), reducing the need for drivers to switch lanes in advance of the Tukwila interchange.

#### **Disadvantages**

- Addition of a third EB lane requires widening of the SR 518 cross-section adjacent to the unstable slopes identified immediately to the south of the SR 518 facility. Initial inspection suggests that there is sufficient room between the existing outside shoulder and the toe of the rock-buttressed slope to provide an additional lane, with drainage provided underneath a new shoulder. Alternatively, the alignment could be shifted to the north by one lane width to avoid potential unstable slopes. Detailed preliminary engineering is required to make a final determination on the geometric feasibility and potential cost implications of such construction.
- Improvements to the Airport and SR 99 interchanges may precede the improvements recommended for the Tukwila Interchange and the addition of a third lane. Adoption of a third-lane concept would require improvements at these two interchanges to be



developed such that they did not preclude the addition of a third lane in the future. This could have cost and impact implications that would require consideration as part of the earlier project implementation process for the SR 99 and Airport interchanges. An early decision on which side of the existing alignment a new lane might be added must also be determined to allow advance design of SR 99 improvements.

- Widening of SR 518 could have impacts to identified wetlands paralleling the corridor, including portions of Gilliam Creek. These impacts would require mitigation and also detailed analysis of the biological impact to potential endangered fish species that might exist further downstream.
- Implementation of a third lane would require the bridge overcrossing at 42<sup>nd</sup> Avenue South to be widened. This could result in impacts to the community and local environment.
- Widening of the SR 518 corridor would require continued coordination with Sound Transit improvements proposed within the corridor on the north side of SR 518. Adverse impacts to the proposed transit infrastructure are not anticipated.

**Independent Utility:** Does not affect ability to complete improvements at other interchanges, nor does it require other improvements for its implementation.

#### ***Concept 4 – Lane Configurations***

##### **Advantages**

- Multiple Lane ramps could increase the capacity for high-demand movements, such as the EB to SB and WB to NB movements.

##### **Disadvantages**

- Ramp configurations need to conform to lane balance requirements on the mainline. Because the ability to implement additional lanes on the mainline is limited, ramp configurations are restricted by mainline configurations.
- Opportunities to expand or relocate ramps in this complex interchange are limited due to conflicts with other ramp facilities. A complete interchange rebuild would be necessary to accommodate several significant ramp revisions.

**Independent Utility:** Ramp configurations dependent on mainline configuration.

#### ***D.1.4.2 CONCEPT SCREENING***

The concepts were screened against the evaluation criteria discussed in section VI. This process is summarized and presented in a screening matrix which is presented on the following pages.






#### ***D.1.4.3 RECOMMENDED CONCEPT FOR THE TUKWILA INTERCHANGE***

Recommendations are presented in Section VI.

**Objective 1**

Improve mobility and accessibility along the SR 518 corridor and improve connections to the local street system and regional highway and transportation network. Accommodate near and long-term (2025) travel demand within the SR 518 Corridor.





## Ability to Meet Criteria

Criteria	Concept:				
	No Action	Continue EB Lane to I-405	Right Side Ramp EB SR 518 to I-5	New 3rd Lane EB SR 518	WB to SB 2nd lane on Loop Ramp
Allows for future modifications to meet travel needs through and beyond 2025 (to build out).	Yes	Yes	Somewhat	Yes	Somewhat
Provides/Enhances freight connections to and mobility through the corridor.	No	Somewhat	Yes	Yes	Somewhat
Establishes clear travel routes. Directs trips onto appropriate roadway facilities.	No	Yes	Yes	Somewhat	Yes
Meets projected peak-hour demand for travel on SR 518.	No	Yes	Yes	Yes	Yes
Limits travel delay.	No	Yes	Yes	Yes	Yes
Supports transit service and improves transit connections.	No	Somewhat	Somewhat	Yes	Somewhat
Facilitates HOV use in corridor.	No	Somewhat	Somewhat	Yes	Somewhat
<b>Overall Rating - Objective 1</b>					

**Objective 2** Avoid or minimize detrimental effects to the natural and build environments. Provide options that allow mitigation of unavoidable impacts.

		Ability to Meet Criteria				
Criteria	Concept:	No Action	Continue EB Lane to I-405	Right Side Ramp EB SR 518 to I-5	New 3rd Lane EB SR 518	WB to SB 2nd lane on Loop Ramp
Concept does not result in known fatal flaws (environmental or constructability).		Yes	Yes	Yes	Yes	Yes
Impacts to the natural environment appear avoidable and/or can likely be adequately mitigated?		Yes	Yes	Yes	Yes	Yes
Impacts to the built environment appear avoidable and/or can likely be adequately mitigated?		Yes	Yes	Yes	Yes	Yes
Overall Rating - Objective 2		●	●	●	●	●






**Objective 3** Improves the safety characteristics of the corridor

Ability to Meet Criteria					
Criteria	Concept:	No Action	Continue EB Lane to I-405	Right Side Ramp EB SR 518 to I-5	New 3rd Lane EB SR 518 WB to SB 2nd lane on Loop Ramp
Concept supports WSDOT design standards and policies.		No	Yes	Yes	Yes
Concept minimizes potential vehicle conflict points.		No	Yes	Yes	Yes
Overall Rating - Objective 3					

**Objective 4** Provide compatibility with relevant plans and proposed projects established by neighboring agencies

		Ability to Meet Criteria				
Criteria	Concept:	No Action	Continue EB Lane to I-405	Right Side Ramp EB SR 518 to I-5	New 3rd Lane EB SR 518	WB to SB 2nd lane on Loop Ramp
Concept is, or is likely to be, compatible with plans and programs on-going within the area.		Somewhat	Yes	Yes	Yes	Yes
Implementation of the concept would not preclude other planned transportation improvements.		Yes	Yes	Yes	Yes	Yes
Overall Rating - Objective 4		●	●	●	●	●






























**Objective 5** Establish a plan that allows phasing of environmental analysis, funding, and construction of elements.

		Ability to Meet Criteria				
Criteria	Concept:	No Action	Continue EB Lane to I-405	Right Side Ramp EB SR 518 to I-5	New 3rd Lane EB SR 518	WB to SB 2nd lane on Loop Ramp
	Concepts can be identified as a series of individual projects having independent utility. Concept may be phased if necessary.		Yes	Yes	Yes	Yes
Overall Rating - Objective 5						

**Summary and Recommendation****Ability to Meet Criteria**

Concept:

No Action	Continue EB Lane to I-405	Right Side Ramp EB SR 518 to I-5	New 3rd Lane EB SR 518	WB to SB 2nd lane on Loop Ramp
-----------	------------------------------	-------------------------------------	---------------------------	-----------------------------------

Objective 1 - Mobility and Accessibility					
Objective 2 - Impacts					
Objective 3 - Safety					
Objective 4 - Compatibility					
Objective 5 - Phasability					
<b>Interchange Recommendation</b>					

Key:



Does not meet objective



Partially meets objective



Meets objective



## **D.2 HOV CONCEPTS**

### **D.2.1 Corridor Capacity Needs and Appropriateness of HOV Facilities**

A fatal flaw screening-level analysis was performed to determine initial operational, physical, and cost feasibility. Operational criteria included minimum thresholds, speed and reliability, and carpool definition as defined in the WSDOT HOV System Policy. Physical feasibility was qualitatively ascertained from aerial and on-site survey; a more detailed physical feasibility study will be required at a later point if this alternative is carried forward. Costs were also assessed at a qualitative level based on factors that would contribute to a high, mid-level, or low-cost alternative. Methodologies and findings are described in more detail below.

#### **D.2.1.1 OPERATIONAL FEASIBILITY**

##### **WSDOT HOV Lane Minimum Thresholds**

Washington State Freeway HOV System Policy requires four minimum thresholds for HOV lanes. These requirements and their applicability to this corridor are discussed below.

1. *Facility demand exceeds capacity for more than an hour each day as evidenced by level of service (LOS) E or F.*
  - ⇒ Forecasted 2025 No Action Plus LOS for mainline and ramps are forecasted to be at E or F on the eastern half of the facility and on the Tukwila interchange ramps during the PM peak, and between B and D on the western half of the facility. Detailed LOS by location was presented for the future baseline in section V.
2. *Evidence exists that during peak hours of operation, the HOV lane will move more people than the per lane average of the adjacent general purpose lanes.*
  - ⇒ 2025 No Action Plus HOV person thru-put was forecasted based on the 1999 and 2000 load factors for various mode splits provided by TRAC. An HOV lane is forecasted to carry more people/hour/lane than a GP lane for 5 out of 8 directions/peaks/locations, i.e., for EB, WB, AM and PM peak, on both halves of the facility. HOV use is forecasted to be higher than the GP lanes everywhere during the PM peak. Person thru-put by location and peak hour for HOV and GP lanes are presented for the two occupancy/classification count locations in Table D.1.

**Table D.1**  
**Forecasted HOV Person Through-Put**

	AM Peak Hour		PM Peak Hour	
	HOV	GP	HOV	GP
<b>24th Avenue S Overpass</b>				
Westbound	760	830	2130	1610
Eastbound	1110	970	1690	940
<b>51st Avenue S Overpass</b>				
Westbound	1120	1180	3740	2450
Eastbound	1670	2320	2900	2890

Note: HOV volumes are for 2+ occupancy under the No Build Plus scenario.

Source: Parsons Brinckerhoff

3. *Local support for construction of the HOV lane is demonstrated through active regional support or public surveys.*  
 ⇒ There is no known opposition to improvements or expansion of the HOV system in this area. Utilization of existing HOV facilities on I-5 and I-405 in the area is quite high.
4. *An HOV route segment may also be justified if it enhances HOV system continuity, for example by providing a link between HOV corridors identified in the Freeway Core HOV Lane System.*

⇒ Inside HOV lanes currently exist on both I-405 and I-5 in the vicinity of the I-5/SR 518/I-405 interchange. Direct freeway-to-freeway HOV lanes are provided for the SB to EB and WB to NB movements. There are currently no HOV facilities on SR 518, or on SR 99 or SR 509 in the SR 518 area.

Planned HOV facilities in the area include NB and SB HOV lanes on SR 509, a SB to EB fly-over HOV ramp at the SR 509 interchange, SB HOV lanes on SR 99 from SR 518 south, and a SB to WB HOV ramp at the Tukwila interchange. Two additional GP lanes in each direction are also planned for the I-405 corridor

Provision of HOV facilities on SR 518 would provide a logical extension to the I-5 and I-405 HOV lanes, connect to a major regional facility, and connect to the proposed HOV lanes on SR 99 and 509.

### **WSDOT HOV Speed & Reliability Standards**

Other than meeting minimum threshold requirements, further WSDOT standards and guidelines for HOV lanes include the following points:

- *Reliable speed and travel time advantage for HOV's. Additionally, HOV users are to be able to drive at an average speed of 45 mph or greater at least 90 percent of the peak hour during a consecutive six-month period.*

EMME/2 model results for year 2020 No Action Plus indicate mainline speeds to be below 45 mph during the PM peak hour on most of the SR 518 segments. GP and HOV

forecasted speeds are identical due to the lack of separate HOV facilities in this model. In order to estimate speeds in HOV lanes, calculations were performed based on volumes and volume/capacity (V/C) ratios for HOV lanes, as described in *High-Occupancy Vehicle Facilities*.<sup>1</sup> This approach indicated that HOV users would be able to drive at an average speed of 45 mph or greater for 7 of 8 directions/time periods/locations, i.e., for EB, WB, AM and PM peak, on both halves of the facility. HOV WB speeds are forecasted at 43 mph for the eastern half of the facility during the PM peak. A reliable travel time advantage would be available, but the advantage would be small due to the short distance of the SR 518 facility (0.65 miles to the Airport, 3.4 miles for the whole facility.) These speed calculations are presented in Table D.2.

**Table D.2**  
**Forecasted HOV Speeds**

	AM Peak Hour		PM Peak Hour	
	HOV	GP	HOV	GP
<b>24th Avenue S Overpass</b>				
Westbound	55	52	55	43
Eastbound	55	52	55	49
<b>51st Avenue S Overpass</b>				
Westbound	55	51	43	50
Eastbound	55	46	53	39

Note: HOV speeds are for 2+ occupancy under the No Build Plus scenario.

Source: Parsons Brinckerhoff

### **WSDOT HOV/Carpool Definition**

WSDOT Policy states that the statewide definition for limited access freeways is two or more persons, and also includes motorcycles, buses with 20 or more seats, and public transportation vehicles. Exception to the two+ carpool definition may be made where:

- an HOV is operated on a converted roadway shoulder, or
- where safety may be compromised at higher volumes of HOV traffic due to substandard roadway geometry, or by projected opening-day volumes.
- The definition may also be increased to mitigate cases where the speed and reliability policy is violated.

WSDOT policy states that the carpool definition shall be consistent throughout an HOV route segment. Please note that all of the above HOV operational analyses were performed under a 2+ definition.

<sup>1</sup> Charles A. Fuhs, *High-Occupancy Vehicle Facilities – Current Planning, Operation, and Design Practices*, Parsons Brinckerhoff Monograph #5, New York NY, October 1990, pg. 51.

### **Other Operational Considerations**

An additional operational consideration is that the existing HOV lanes on both I-5 and I-405 are inside lanes. Placement of HOV lanes on the inside on SR 518 without direct access ramps would create weaving problems at the Airport and other access/egress points.

#### **D.2.1.2 PHYSICAL FEASIBILITY**

Physical constraints to the addition of HOV lanes along the SR 518 corridor include lack of a median on most of the facility, as well as closely abutting areas of environmental concern, especially on the eastern half of the facility. Environmental constraints maps were provided in Figure 4.8.

Conversion of a GP lane to HOV use would be possible along certain segments of the facility, but not recommended between the Airport and Tukwila interchanges where V/C is over 1.0 WB, and 0.85 or higher EB during the PM peak.

Conversion of a shoulder to HOV use would need to take into consideration the existence of two mainline and seven ramp HAL's and an HAC, as well as the existence of multiple horizontal and vertical curves which could compound safety issues. In addition, one of the two existing shoulders will be required for the continuation of the 2<sup>nd</sup> EB lane which was included in the recommended concept for the Tukwila interchange.

Physical feasibility is considered to be slightly higher in the Tukwila interchange, due to the existence of more right-of-way, and more space between existing structures. Due to the complex nature of the existing interweaving ramps at this interchange, any improvements would require a more detailed physical feasibility analysis.

#### **D.2.1.3 COST ASSESSMENT**

Due to the existing configuration, lack of a median for most of the facility, and closely abutting environmental constraints, adding lanes to this freeway facility may need to involve some type of horizontally or vertically separate facility for some or most of the alignment, i.e., HOV lanes which were built in parallel to, or stacked above, SR 518. Likewise, freeway-to-freeway HOV ramps would very likely need to be fly-overs or drop-down ramps. All of these options involve a higher-than-normal cost. Direct access ramps would also add to a high cost scenario.

### **D.2.2 Concepts Considered**

Because of the separate physical and operating conditions, HOV lanes along SR 518 were separated into three general areas: the western half of the facility (SR 509 to Airport), the eastern half of the facility (Airport to I-5), and the Tukwila interchange.

### **D.2.3 Screening Analysis**

As a first-level initial screening, meeting of the various thresholds was applied to

Forecasted operations for HOV lanes along the SR 518 corridor are expected to meet or exceed WSDOT minimum thresholds and other guidelines in terms of level of service, person throughput, enhancement of system continuity, and speed and reliability. Because of the physical

limitations and associated prohibitive costs involved, however, the only location taken forward for further consideration was at the Tukwila interchange.

Tukwila interchange HOV improvements would focus effort on supporting the transition to and from existing HOV facilities on I-5 and I-405. Although a detailed physical feasibility analysis would be required, right-of-way within the interchange appears to be sufficient for additional freeway-to-freeway HOV ramps. This interchange will need to undergo re-configuration for the proposed I-405 improvements. Coordination with this project will allow for more flexibility in ramp and structure design, and will help to combine costs.

The movements at the SR 518/I-5/I-405 interchange that do not have freeway-to-freeway HOV lanes are, in order of forecasted 2025 No Action Plus volumes:

- WB Through (3100/1510 PM/AM)
- NB to EB (2640/1650 AM/PM)
- EB to NB (2280/2270 PM/AM)
- WB to SB (2100/1530 PM/AM)
- SB to WB (1930/1720 AM/PM)
- EB Through (1770/980 PM/AM)
- NB to WB (1350/630 PM/AM)
- EB to SB (1200/960 PM/AM)

The WB through movement, although carrying the highest percentage of overall traffic movements through the interchange, would most likely not benefit from a separate HOV facility. AM and PM congestion levels through the interchange are relatively light, with a V/C of 0.7 during the PM peak and 0.3 during the AM. WB HOV vehicles are not anticipated to have difficulty merging to the right into the GP lane once the WB HOV lane ends.

A screening matrix was prepared to summarize the initial screening process for operational feasibility, physical feasibility, and costs discussed above. The matrix is presented in Table D.3.

**Table D.3**  
**Screening Matrix for HOV Concepts**

	Oper. Feas.	Phys. Feas.	Cost	TOTAL
Western 1/2 of Facility	●	○	○	●
Eastern 1/2 of Facility	●	○	○	●
Tukwila Interchange	●	●	○	●

Ranking Symbols: ○ (lowest) to ● (highest)

Source: Parsons Brinckerhoff

The overall ranking for the three locations came out low, with the Tukwila interchange location slightly higher due to a better ratings for operational and physical feasibility.

#### **D.2.4 Recommended HOV Concept**

Concept recommendations are detailed in Section VI.

## **APPENDIX E: SR 518/SR 99 ADDITIONAL ANALYSIS**





**To:** Carol Hunter  
**From:** Stephen S. Rolle  
**Date:** December 14, 2001  
**Subject:** SR-518 Central Corridor Concepts Analysis

Enclosed are two copies of a CD containing analysis performed on the central segment (SR-99 to 24<sup>th</sup> Avenue S) concepts for SR-518. Traffic analysis on the three most recently evolved concepts (see attached figure) is presented. These are:

- Split Diamond Interchange
- Split Diamond with Loop
- SPUI (Phase I)

For each concept, Synchro plots showing intersection LOS and volume inputs are provided. Also provided are SimTraffic delay and queuing reports for three distinct simulations of each concept. An Excel Spreadsheet tabulates and summarizes the results of these simulations for the SR-99 corridor. For reference, a Synchro network for the full build-out of the SPUI concept (which requires a 3<sup>rd</sup> EB lane on SR-518) is also included, though traffic analysis for the full build out concept is not presented.

This information was requested by both the City of Sea Tac (Don Monaghan) and the Port of Seattle (Dan Burke). Both wanted to pass this information on to their staff to review and confirm. With your approval, I will also distribute this information to them.

### **Analysis Notes**

- Variations of each alternative (such as grade separation of westbound through traffic at 24<sup>th</sup> Avenue South) are possible. The alternatives tested here represent the basic implementations of each concept.
- Arterial improvements were limited to the roadways affected by the interchange, and do not extend beyond the interchange area. For example, the south and west legs of SR-99/S 154<sup>th</sup> St involved improved channelization to accommodate the concepts, but the north and east legs were analyzed in their current configuration.
- To the extent possible, consistency was maintained between the networks modeled.
- Signal timings were optimized for each concept using Synchro's optimization routines.

## OVERVIEW OF APPENDIX E MATERIALS

An additional level of analysis was conducted on the central segment concepts (24<sup>th</sup> Ave S/NAE/SR 99 Interchange area) to help gauge their potential to meet traffic operational needs. This appendix presents summary results from this analysis, which was distributed to members of the study team.

The analysis presented in this appendix was conducted using forecast traffic volumes developed for the City of SeaTac's/Port of Seattle's Joint Transportation Study (JTS), rather than the SR 518 volumes presented elsewhere in this report. The reasons for using the JTS volumes were that a the JTS study encompassed a wider study area (including all of the arterial intersections in the central interchange area); and JTS forecast volumes were slightly higher on the most congested facilities, and therefore represent a more demanding traffic analysis scenario for the interchange area.

- JTS 2020 Volume Forecasts (9/24) for were used for each concept. Volumes were shifted from the SPUI forecasts as necessary to represent the traffic patterns of each concept.

## **General Findings**

- Synchro Calculated LOS indicates lowest overall intersection delay for the Diamond/Loop option (one intersection at LOS C). The Diamond option operates at LOS C, but involves two signalized intersections rather than one. The SPUI is forecast to operate at LOS D under phase I conditions.
- North-south delay was found to be less for the Diamond and Diamond/Loop options than for the SPUI concept. Two factors in this difference are that (1) The WB to NB and WB to SB volumes are not well balanced (taking away some of the operational advantage of the SPUI); and (2) The SPUI has to accommodate all movements at a single location (so delay is concentrated there), while the other concepts involve either free movements (e.g. – Diamond/Loop) or fewer movements (Diamond) at each intersection.
- East-west delay for ramp traffic is lower for the SPUI concept than for either diamond concept.
- Significant queuing/blocking problems are forecast for the Diamond option. The short storage lengths available for left turn lanes on SR-99 essentially eliminate this as a viable alternative, even though the delay/LOS characteristics look favorable.

## Figure EX-5 24<sup>th</sup> Avenue S/Airport/SR 99 Interchange Concepts

*Concept refinement and evaluation to be confirmed at  
Advisory Meeting on November 29th*

### Split Diamond

Features:

- Ramps to/from the east at SR-99.
- Ramps to/from the west at 24<sup>th</sup> Ave S.
- One-way frontage roads connecting 24<sup>th</sup> Ave S and SR-99.
- Ramp terminal intersections at SR-99 and 24<sup>th</sup> Ave S are signalized.



### Modified Split Diamond/Loop

Features:

- WB ramp from SR-518 to NB SR-99.
- WB ramp that diverges from NAE offramp to SB SR-99 (via loop ramp) and 24<sup>th</sup> Ave S (via frontage road).
- Frontage roads connecting ramps at 24<sup>th</sup> Ave S and SR-99.
- Slip ramp from 154<sup>th</sup> Ave S to WB frontage road for WB traffic from SR-99.
- Ramp terminal intersections at SR-99 (EB ramp only) and 24<sup>th</sup> Ave S are signalized.



### Phased Combined Diamond/SPUI

Features:

*Phase I*

- Full SPUI at SR-99.
- Partial 24<sup>th</sup> Ave S Interchange.

*Optional Phase II*

- Complete 24<sup>th</sup> Ave S Interchange concurrent with, or after, 3<sup>rd</sup> eastbound lane on SR 518.



## Average Vehicle Delay on SR-99 and Associated Ramps

Diamond			
SR-99	Delay/Vehicle		
	Node	Southbound	Northbound
S 154th St	13	375	13
WB Ramp	51	28	51
EB Ramp	31	22	49
Ramps			
Delay/Vehicle			
WB Ramp at SR-99	51	31	
EB Ramp at SR-99	31	120	

Diamond & Loop			
SR-99	Delay/Vehicle		
	Node	Southbound	Northbound
S 154th St	13	485	45
WB Ramp	subtotal	4	24
	53	1.3	7.7
	51	2.3	16.1
EB Ramp	31	31	35
Ramps			
Delay/Vehicle			
WB Ramp at SR-99	51	41	
WB Loop	53	7	
EB Ramp at SR-99	31	70	

SPUI (Phase I)			
SR-99	Delay/Vehicle		
	Node	Southbound	Northbound
S 154th St	13	676	18
WB Ramp	33	77	3
SPUI	31	144	51
EB Ramp	36	2	71
Ramps			
Delay/Vehicle			
WB Ramp at SR-99	33	17	
WB at SPUI	31	59	
EB at SPUI	31	48	
EB Ramp at SR-99	36	12	

## 95th Percentile Queuing on SR-99 (Signalized Intersections Only)

Blue indicates queue exceeds available storage

### Diamond

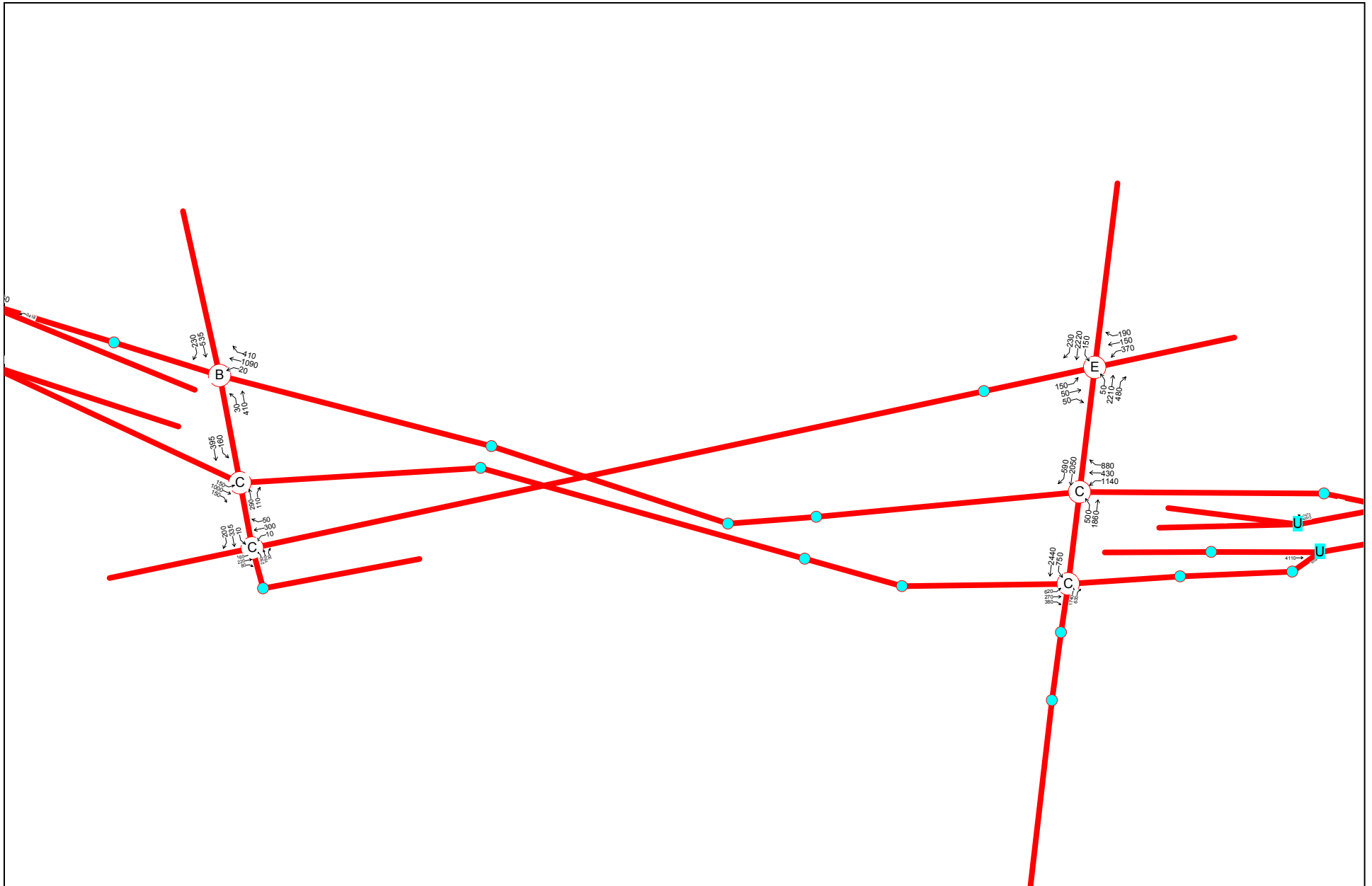
SR-99	Node	95th % Queue Southbound		Through Movements		Northbound		Through Movements	
		Left Turns	Queue	Storage	Queue	Storage	Left Turns	Queue	Storage
S 154th St	13	249	325	808	not coded	45	250	216	410
WB Ramp	51	N/A	N/A	381	410	453	364	475	364
EB Ramp	31	376	364	321	364	N/A	N/A	>1000	not coded

### Diamond & Loop

SR-99	Node	95th % Queue Southbound		Through Movements		Northbound		Through Movements	
		Left Turns	Queue	Storage	Queue	Storage	Left Turns	Queue	Storage
S 154th St	13	287	325	1185	not coded	449	375	457	375
EB Ramp	31	432	472	457	472	N/A	N/A	>1000	not coded

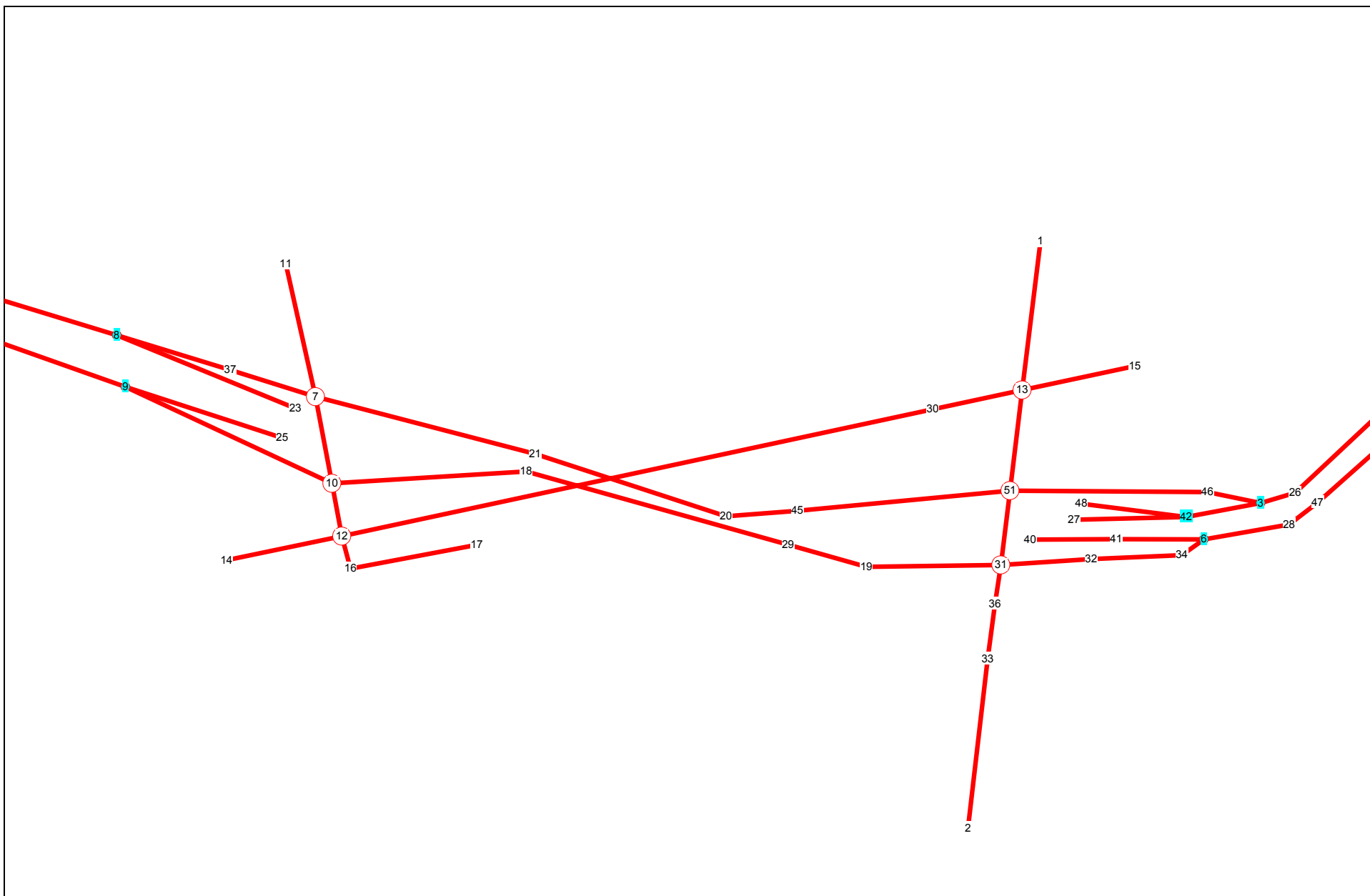
### SPUI (Phase I)

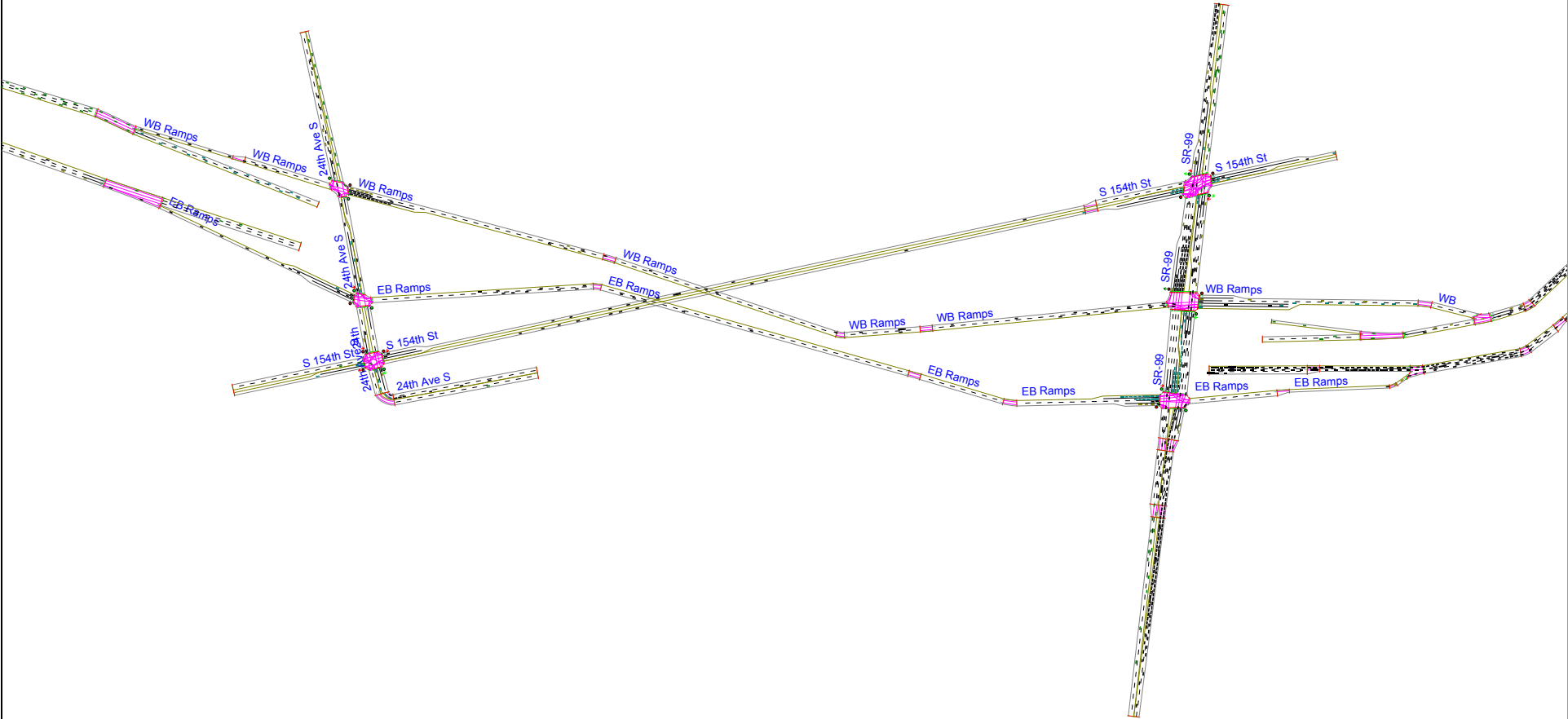
SR-99	Node	95th % Queue Southbound		Through Movements		Northbound		Through Movements	
		Left Turns	Queue	Storage	Queue	Storage	Left Turns	Queue	Storage
S 154th St	13	383	325	869	not coded	57	250	480	325
SPUI	31	173	434	509	434	176	>300	179	not coded

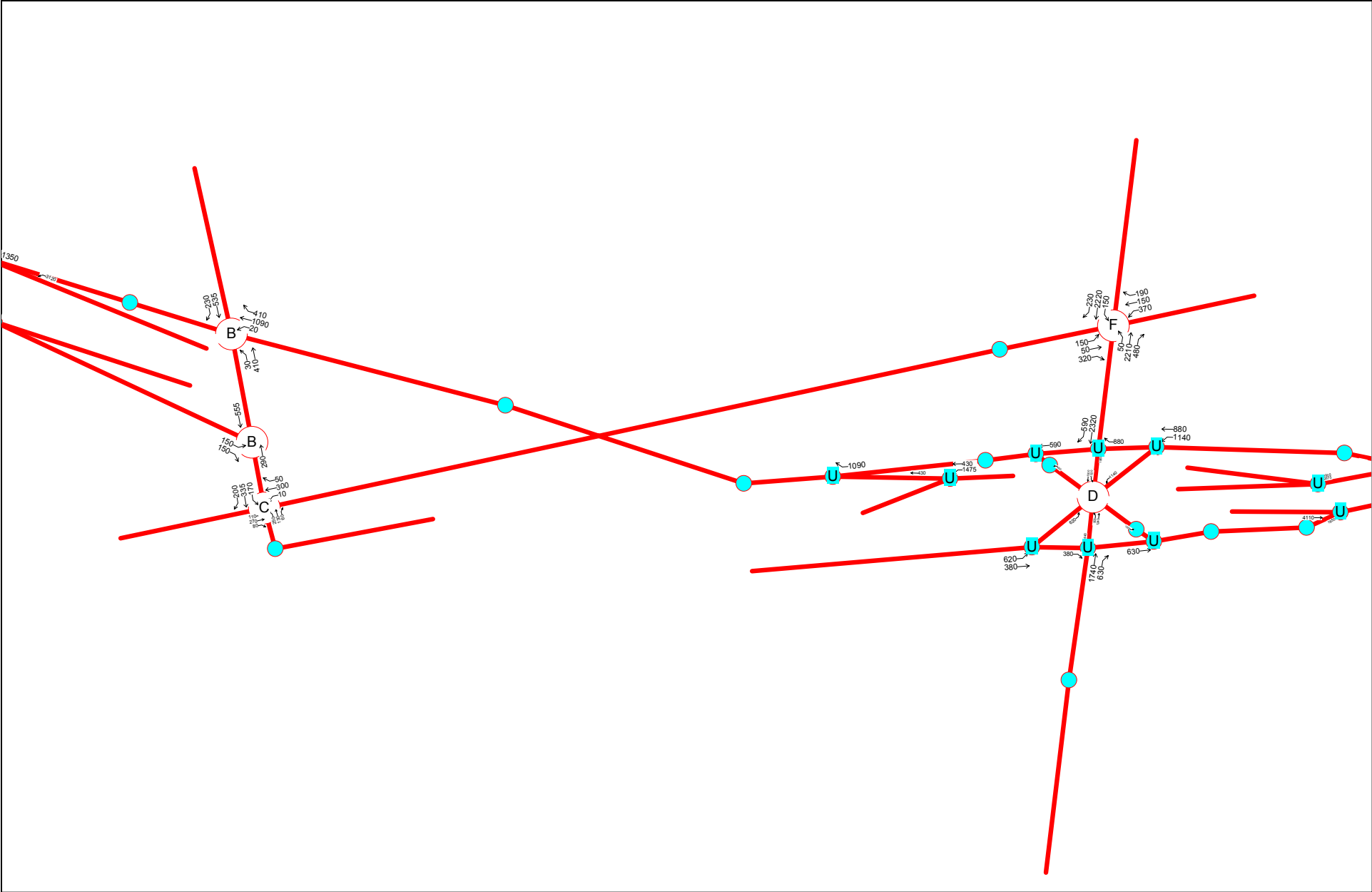


## LOS and Volume

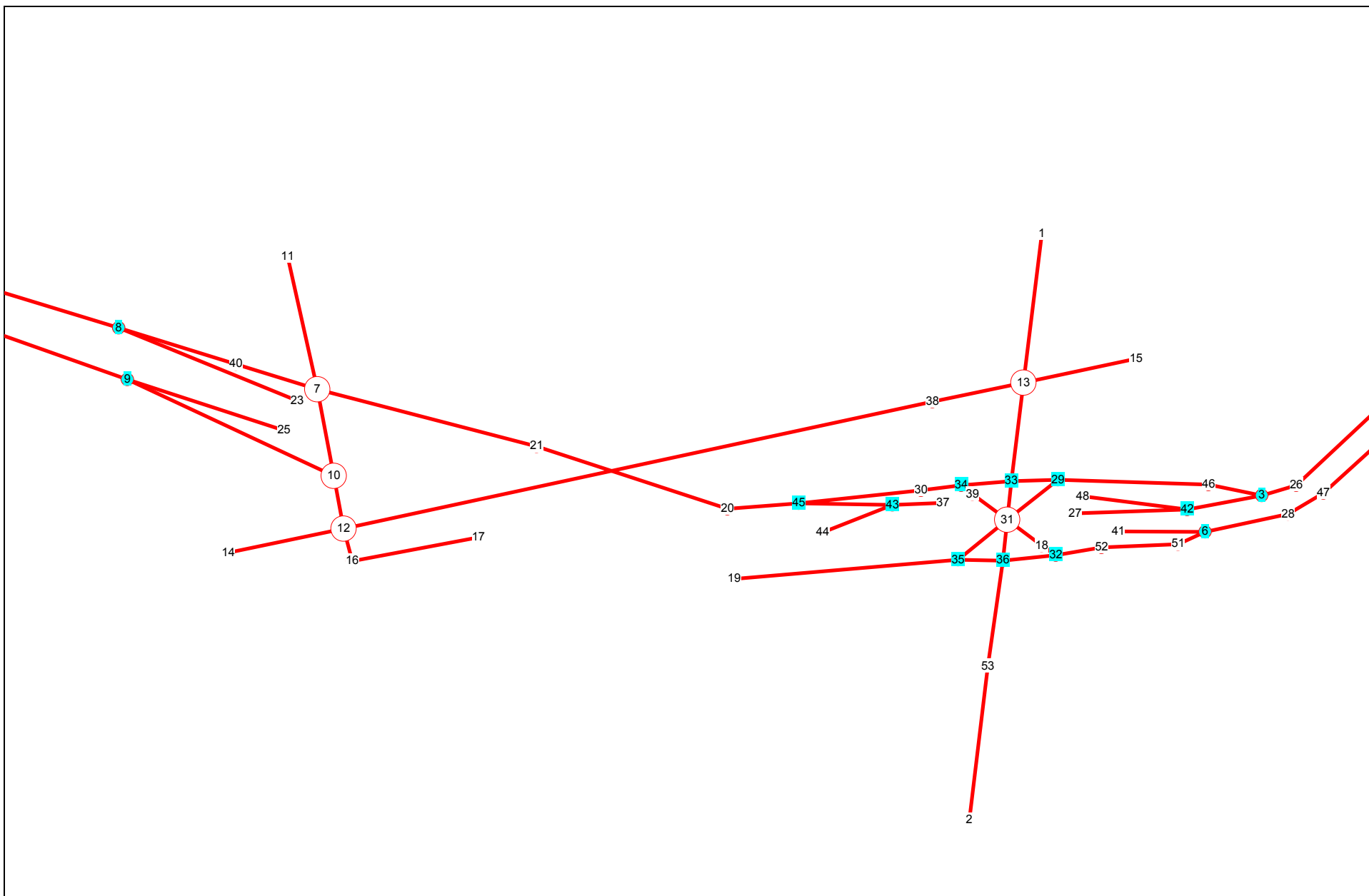


Node ID  
SSR

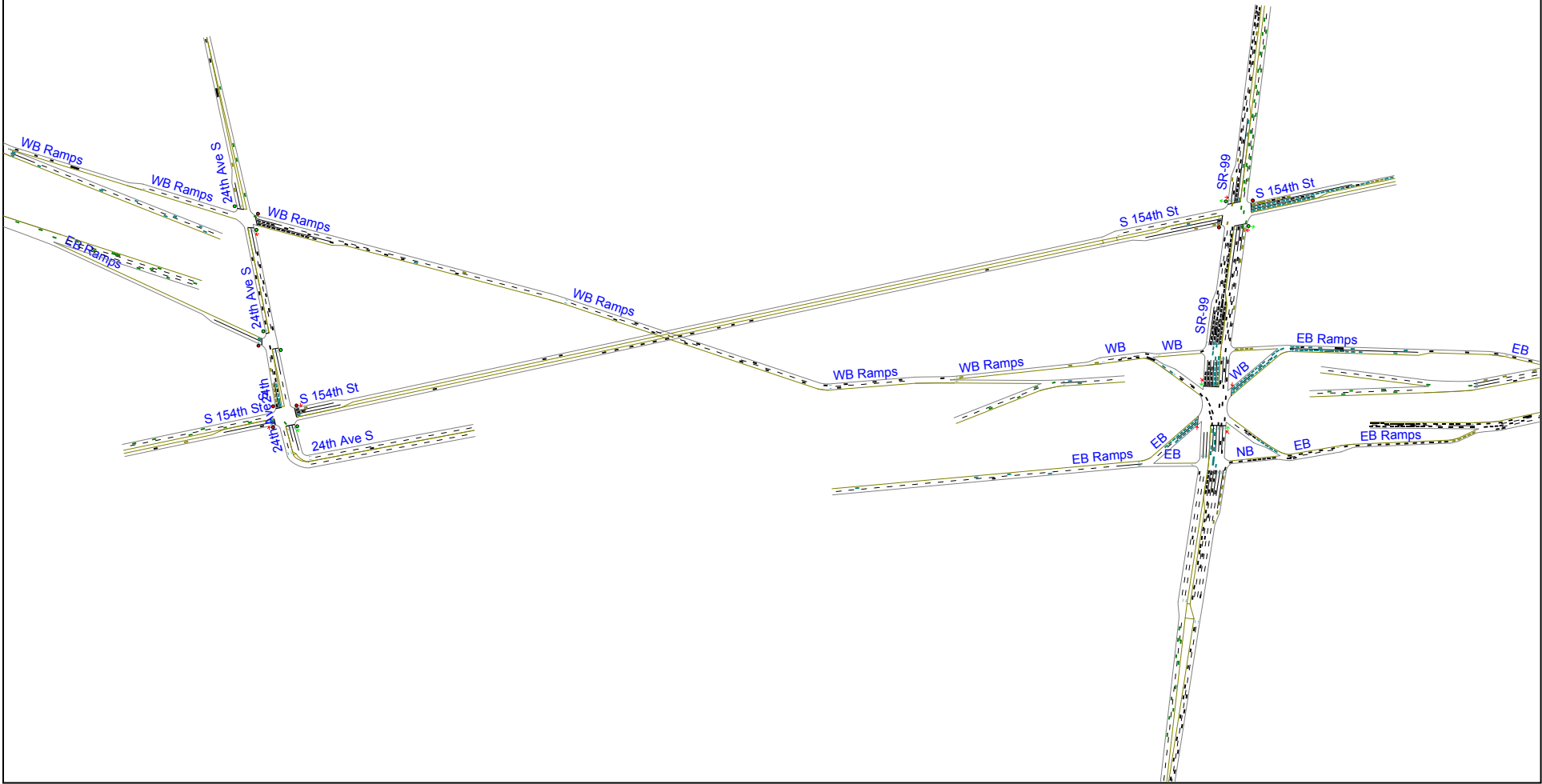




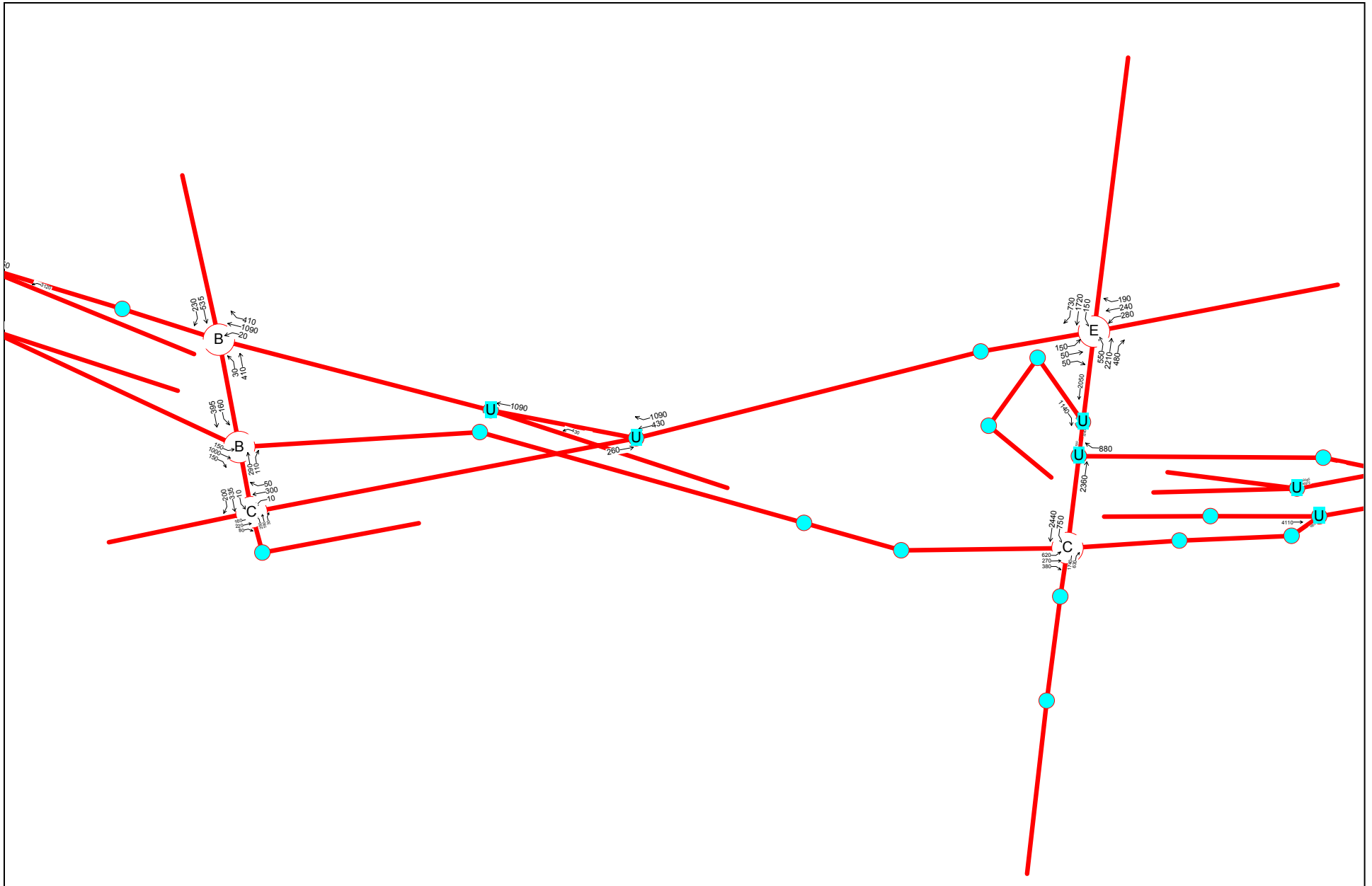
LOS and Volumes



Node ID

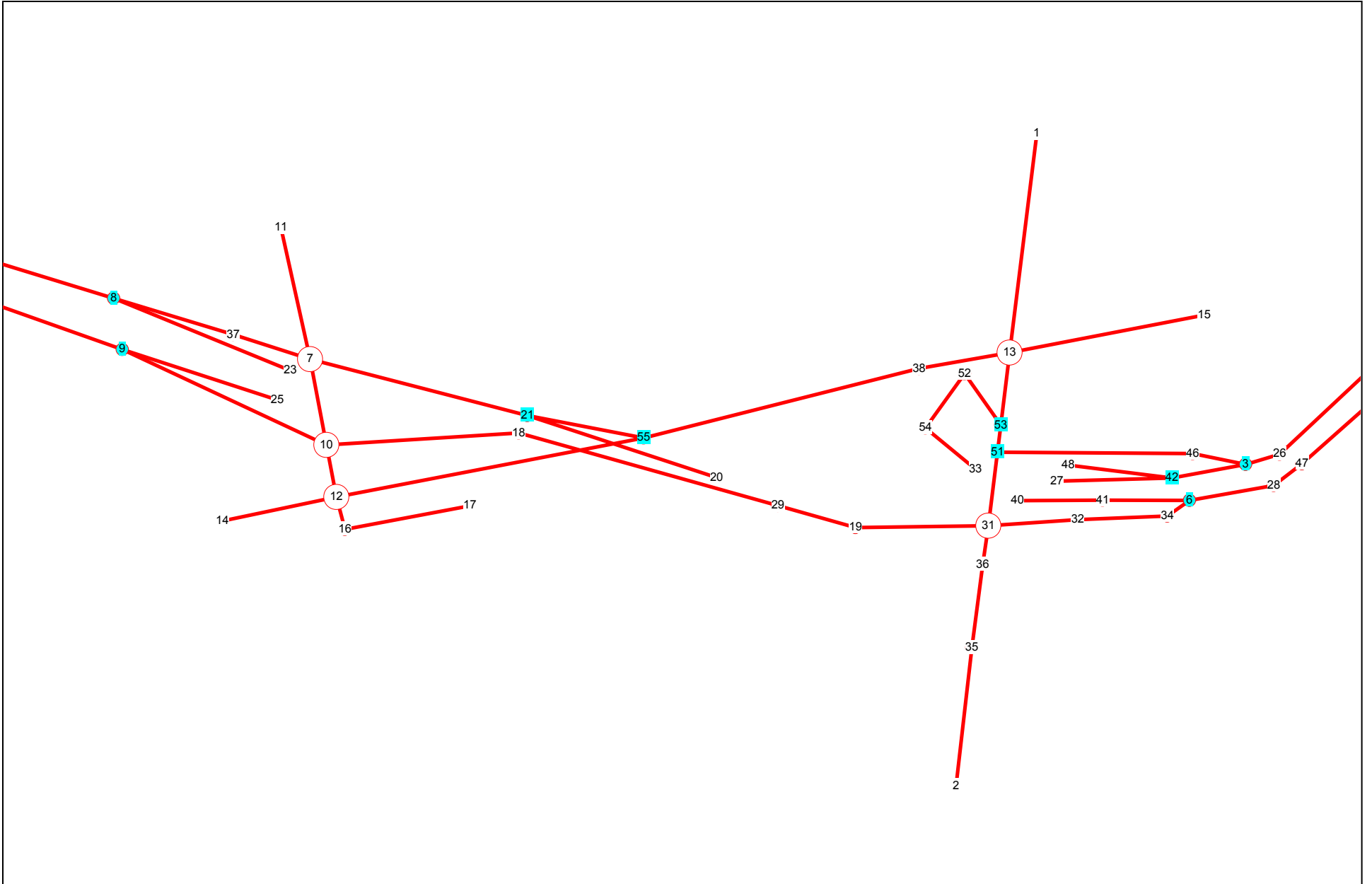


Network

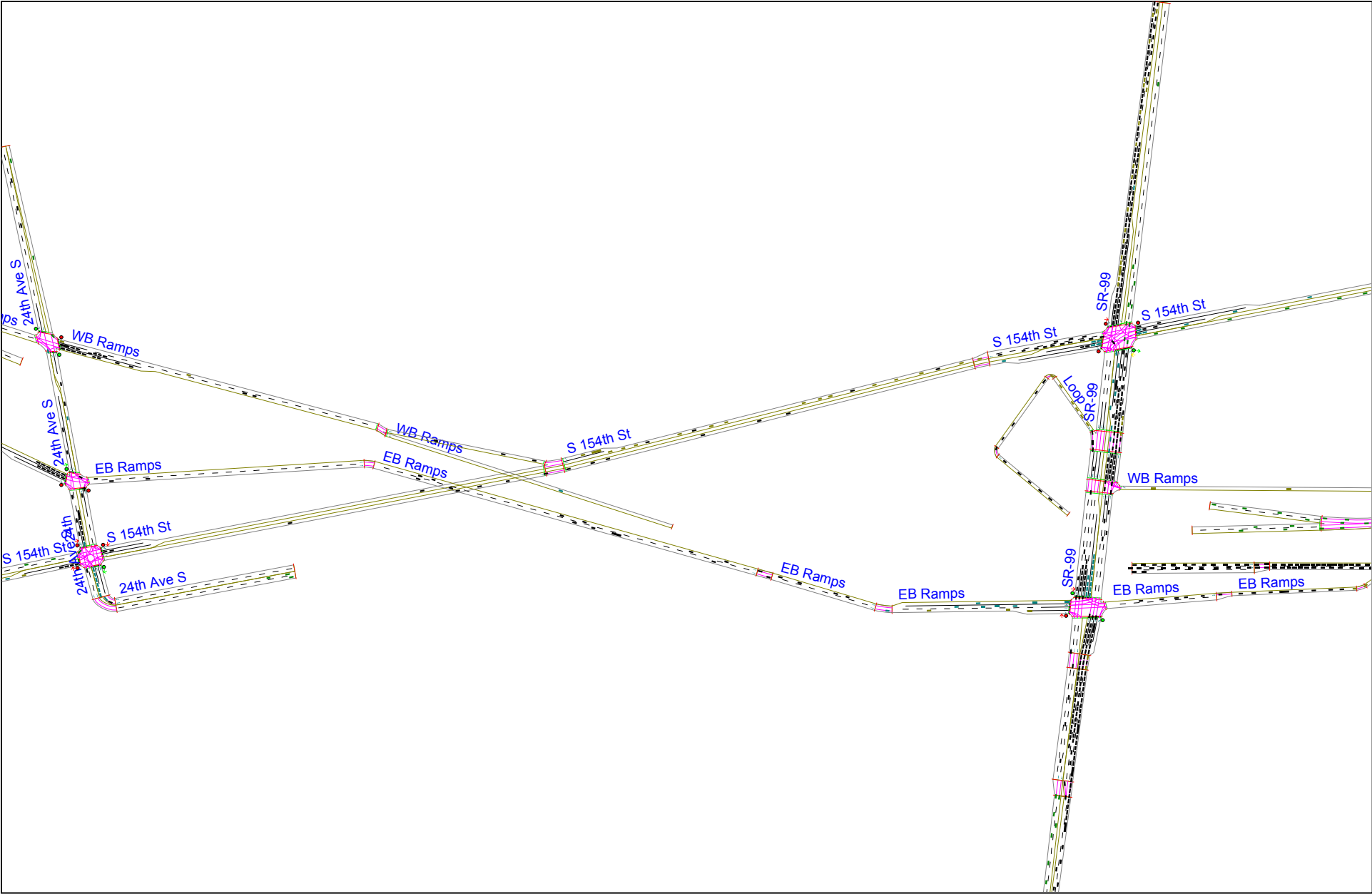


## LOS and Volumes

### SSR

Node ID  
SSR





## **APPENDIX F:**

## **PUBLIC INVOLVEMENT**

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## Appendix F – Public Interaction Plan

Following is the SR 518 RDP and EA Public Interaction Plan.

# Project Interaction Plan

June 20, 2001

518

RDP/EA

**Prepared for:**

Washington Department of Transportation  
Office of Urban Corridors

**Prepared by:**

Norton-Arnold & Janeway

SR 518 Study Team

Parsons Brinckerhoff  
TranSystems  
Herrera Environmental  
Norton-Arnold & Janeway  
HS Public Affairs  
CivilTech  
Lin and Associates, Inc.



**Washington State  
Department of Transportation**

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# **INTRODUCTION**

## **PROJECT BACKGROUND**

The SR 518 Route Development Plan (RDP) and SR 518/SR 99 Interchange EA project area spans the entire length of SR 518 from the SR 509/518 interchange on the west to the I-5/I-405 interchange on the east. The project will develop a long-range vision for the corridor.

The RDP follows a standard corridor planning process and will occur in three phases; 1) analysis of existing and future traffic and roadway conditions in the corridor, 2) identification of the needs and deficiencies in the corridor, and 3) formulation of solution alternatives and creation of a Route Development Plan. An Environmental Assessment (EA) of the SR518/SR99 interchange will also be prepared as part of the project.

The Route Develop Plan affects several cities, neighborhoods, and government jurisdictions. Coordination of the project phases with several agencies and organizations must coordinate is needed to ensure the RDP's success. This public involvement plan outlines methods for agency coordination and public involvement.

A Project Advisory Committee comprised of representatives from local, state, and federal agencies will oversee the work of the consultant team. This Committee will ensure the Plan achieves its goals and will serve as a point of coordination between this project and several others that will influence it. Those include the Port of Seattle's Master Plan Update for SeaTac International Airport, the Joint Transportation Study between the City of SeaTac and the Port of Seattle, and Sound Transit's plan for construction of light rail along SR 518 or SR 99.

The SR-518 RDP/EA project will also require coordination with other important regional projects, including WSDOT's I-405 Programmatic EIS and the SR 509 Extension EIS, the STIA South Access as well as the City of SeaTac's Phase III International Boulevard Project and its anticipated freeway access needs. The RDP/EA will also coordinate with Sound Transit's regarding the Link Light Rail proposals and King County Metro Transit to ensure future corridor improvements don't preclude their development plans.

In addition to transportation agencies, the project will also coordinate with the cities of SeaTac, Burien, and Tukwila to ensure compatibility with their plans.

## **Project Need**

Traffic is forecast to increase significantly due to growth in the surrounding communities as well as expected growth in activity at SeaTac International Airport. The RDP will identify the level of improvements needed to maintain access and mobility throughout the SR 518 corridor through 2025. Current traffic congestion from the North Airport

Expressway (NAE) to the I-5/I-405 access shows a need for improvements to address volume along the SR 518 mainline and access from SR 99/24<sup>th</sup> Ave. S/NAE. Because access to SR-518 from SR 99/ International Blvd. is inefficient, drivers are using the NAE as an access route to SR-518, a non-state owned facility.

Further into the future, forecasts show increasing congestion at each end of SR 518. Improvements such as the SR 509 Extension and STIA South Access will have some effect in reducing the demands placed on SR 518, but improvements will be needed to accommodate traffic through the SR 509/SR 518 and the I-5/I-405 interchanges.

## **PROJECT PURPOSE**

To identify infrastructure improvements necessary to reasonably accommodate forecast traffic growth, improve traffic operations on the SR 518 corridor, and provide adequate access to SeaTac International Airport and the surrounding communities of SeaTac, Burien, and Tukwila.

## **GOALS FOR THE PUBLIC INTERACTION PLAN**

The Public Involvement Program will:

- 1) Inform all stakeholders in the project area about the Route Development Plan and its outcomes.
- 2) Engage these stakeholders in selecting the best options for corridor improvements.
- 3) Develop stakeholder support- for the outcome of the Route Development Plan, and continue this support through the EA process, design and construction of the identified improvements.

# **PUBLIC INTERACTION PLAN**

## **STRATEGIES TO INVOLVE THE PUBLIC**

The project Team will use following strategies during the SR 518 Route Development Plan process to guide public involvement activities and achieve plan goals.

- Project Advisory Committee
- Comprehensive Mailing List
- Web Site
- Newsletters
- Paid Advertisements
- Handouts and Questionnaires
- Prepare and Facilitate Public Meetings

### **Project Advisory Committee**

#### *DESCRIPTION:*

A Project Advisory Committee has been convened for the Plan and includes representatives from all jurisdictions in the project area, as well as other government agencies that may be affected by the RDP. The Committee will be informed and involved in all aspects of the project, and will serve as the focal point for the public involvement program. The Project Advisory Committee will also provide guidance and input to the SR 528 RDP and SR 99 EA alternatives development, selection and analysis.

#### *TIMEFRAME:*

The Committee will meet regularly throughout the project. The first PAC meeting is scheduled for June 21, 2000 with subsequent meetings scheduled as needed. Meetings will be half-day meetings and will be timed to coincide with project milestones such as RDP alternative development, RDP final, EA scoping and alternatives development, and design.

#### *ROLES AND RESPONSIBILITIES:*

Heidi Stamm Public Affairs will facilitate the Committee; Norton Arnold & Janeway will attend and document the meetings.

### **Comprehensive Mailing List**

#### *DESCRIPTION:*

A mailing list will be compiled at the initiation of the Plan and updated for use for the duration. The list will be used to contact stakeholders in the project area and will be maintained in word.



*TIMEFRAME:*

The initial mailing list will be compiled in June 2001 and updated monthly as new data is available.

*ROLES AND RESPONSIBILITIES:*

Norton Arnold & Janeway will compile and maintain the list using sources from WSDOT and others.

## **Web Site**

*DESCRIPTION:*

WSDOT will develop a web site for the SR 518 Route Development Plan/Environmental Assessment project. The web site will provide similar information as the newsletters, as well as other timely information, and provide additional opportunity to comment.

*TIMEFRAME:*

The interactive web site will be in place throughout the project.

*ROLES AND RESPONSIBILITIES:*

The consultant team will regularly provide information to WSDOT for publication to the web site. WSDOT staff will maintain the site.

## **Newsletter**

*DESCRIPTION:*

The newsletters will be timed to coincide with completion of RDP and the alternatives screening process; notice of the EA/Design Hearing; and after the preferred alternative is selected and the EA is complete. Each newsletter will include project updates, as well as opportunities to comment on the alternatives under development and consideration. Target audiences include community and neighborhood stakeholders, business interests, local jurisdictions and commuters.

The newsletters will be mailed to a comprehensive mailing list developed for the project. The first newsletter will describe the SR 518 Route Development Plan, announce the public scoping meeting, characterize the initial alternatives and the project's relationship to other projects in the area, and the goals and process for the project. The second newsletter will announce the EA/ Design Hearing, provide details about the alternatives under evaluation and share the preliminary designs. The third newsletter will discuss the conclusions of the EA and Route Development Plan and selection of the preferred alternative. Each of the newsletters will be designed to allow recipients to comment on the project, or to request a presentation at their group meetings via a tear off comment/request form.

*TIMEFRAME:*

The first Newsletter will be distributed in September 2001, with the second to follow in March 2002 and the third in summer 2002.

*ROLES AND RESPONSIBILITIES:*

Norton Arnold & Janeway will draft and design the newsletters as well as coordinate their distribution, gather any comments sent in by recipients, and coordinate requests for presentations. WSDOT will be responsible for printing and mailing the fact sheets.

## **Paid Advertisements**

*DESCRIPTION:*

Notice of public meetings and of availability of project documents will be accomplished through legal notices and display advertisements in local papers. Advertisements should include date, time and location of meeting or where and how documents can be viewed or acquired.

*TIMEFRAME:*

Adequate notices prior to public meetings is important and will occur at least three weeks prior to the meeting and again 5 to twelve days prior to the meeting

*ROLES AND RESPONSIBILITIES:*

Norton Arnold & Janeway will prepare drafts of the materials and provide electronic versions to the state for distribution.

## **Handouts and Questionnaires**

*DESCRIPTION:*

Preparation for each public meeting will include draft and final meeting handouts and other materials to facilitate public understanding and involvement. Each packet should include a summary of the project, purpose and need, key issues, proposed alternatives, project schedule and process. Handouts should solicit public comment, and include a tear off comment form.

*TIMEFRAME:*

Meeting materials will be prepared to provide adequate review and input from project team members and WSDOT staff.

*RESPONSIBILITY:*

Norton Arnold & Janeway will prepare drafts of the materials and provide electronic versions to the state for distribution.

## **Prepare and Facilitate Public Meetings**

### *DESCRIPTION:*

Two public meetings will be held during the project. The first will formally introduce the project to the public, identify key issues of public concern, provide an opportunity for the public to comment on project alternatives, and share the findings of the RDP. The second public meeting will be a combined open house to describe the results of the EA and an informal Design Hearing.

As part of the scoping process and as an element of the informational program strategy, public workshops will be held. The workshops will be used to both share information as well as provide opportunity for the public to comment on the Environmental Assessment and the Alternatives under consideration in the Plan.

### *TIMEFRAME:*

The first will be held in September 2001, the second in March 2002

### *ROLES AND RESPONSIBILITIES:*

Norton Arnold & Janeway will plan and facilitate the community meetings, develop presentation materials with technical assistance from team members, and document the results of the discussions that take place.

# **PLAN AUDIENCE**

## **CORE CONSTITUENCIES AND KEY ISSUES**

This public involvement plan has been designed with a variety of strategies to inform and involve as many people as possible and address their key concerns. The core constituencies for the SR 518 Route Development Plan include:

### **Local Jurisdictions**

The project area includes the cities of SeaTac, Tukwila, Burien and Des Moines. Officials from each of these cities, as well as the Port of Seattle, are included on the Project Advisory Committee. In addition, the SR 518 public involvement plan will provide opportunities for the elected officials from these jurisdictions to learn about the need for a plan to improve the existing conditions for transportation and freight mobility, and comment on the alternatives.

Other local, regional, state and federal agencies with a direct interest in SR 518 will also be included. The Project Advisory Committee will include representatives from the Port of Seattle, Sound Transit, King County Metro, WSDOT, FAA and FHWA.

### **Community and Neighborhood Groups**

The project's affected area is densely populated, including both residential areas and business districts. Neighborhood groups may be concerned about impacts from any new construction and/or traffic impacts in their neighborhoods. Likewise, community members may be keenly interested in the proposed intersection of SR 518 with city "gateways" such as that proposed for Burien. There will also be strong community interest in the project's affects, if any, on planned developments at the Seattle-Tacoma International Airport.

### **Business Interests**

SR 518 serves as a vital link for the movement of both goods and employees. Major employers throughout the project area are likely to be interested in the outcome of the project.

### **Daily Commuters**

Individuals who commute through the SR 518 Corridor area are also likely to be interested in any potential corridor improvements. However, they are a difficult group to reach on a limited budget. Outreach work to the local cities will also serve as a conduit of information to commuters.

## **IDENTIFIED STAKEHOLDERS**

*(a preliminary list)*

### **Community Groups:**

- McMicken Heights Community Club – located in SeaTac, just south of SR 518
- Riverton Heights
- Residents in SeaTac, Burien, and Tukwila

### **Agencies**

- Port Of Seattle Port of Seattle/Seattle-Tacoma Int'l Airport  
PO Box 68727  
SeaTac WA, 98168

### **Business Groups:**

- The Southwest King County Chamber of Commerce  
(206) 575-1633
- Chamber of Commerce, City of SeaTac
- Chamber of Commerce, City of Burien
- Chamber of Commerce, City of Tukwila
- Auto Dealers on the SR 509/SR 518 Corridors
- Automobile Transporters Auto Driveway Co.  
20040 Pacific Hwy. S.  
Burien WA 98198
- Hotels, Restaurants
- Freights Companies

### **Transportation Groups:**

- Highway 99 Action Committee
- Limousine and Taxi Services

## **Local Elected Officials:**

Steven Mullet, Mayor  
City of Tukwila  
6200 Southcenter Blvd.  
Tukwila, WA 98188  
206-433-1850

Shirley Thompson, Mayor  
City of SeaTac  
17900 International Blvd, Suite 401  
SeaTac, WA 98188

Sally Nelson, Mayor  
City of Burien  
415 SW 150<sup>th</sup>  
Burien, WA 98166

## **LOCAL MEDIA:**

- The Seattle Times  
1120 John Street, Seattle 98111  
(206) 624-7355
- The Tacoma News Tribune  
1950 South State Street, Tacoma, Washington 98405  
253-597-8742  
Fax: 253-597-8274
- South County Journal (for Tukwila)  
600 South Washington, Kent WA 98032  
Phone: 253-872-6600  
Fax: 253-854-1006
- The Federal Way News  
32015 First Avenue South  
Federal Way  
(253) 838-7622
- The Highline Times/Des Moines  
133 SW 153<sup>rd</sup>  
Burien, WA  
(206) 444-4873

## **PROGRAM IMPLEMENTATION**

### **SCHEDULE FOR PUBLIC INVOLVEMENT ACTIVITIES**

The public involvement activities outlined on the following pages will generally occur in three phases:

- 1) At the beginning of the project, to inform stakeholders about all aspects of the project. This public involvement work begins in May 2001.
- 2) In October 2001, when the Route Development Plan is completed, and alternatives are identified.
- 3) When the preferred alternative is selected and the Environmental Assessment (EA) is complete in May 2002.

### **TIME LINE**

<b>May 2001</b>	<b>August \ September 2001</b>	<b>March 2002</b>	<b>Summer 2002</b>
<ul style="list-style-type: none"><li>◆ Project mailing list</li><li>◆ Public Presentations</li><li>◆ Web site</li><li>◆ Project Advisory Committee</li></ul>			
	<ul style="list-style-type: none"><li>◆ First Newsletter</li><li>Public Scoping Meeting-Alternatives Shared</li></ul>	<ul style="list-style-type: none"><li>◆ Second Newsletter</li><li>◆ EA/Design hearing</li></ul>	<ul style="list-style-type: none"><li>◆ Third/Final Newsletter</li></ul>

## Appendix F – Project Advisory Committee Meeting Summaries

Following are meeting summaries for PAC meetings held June 21, August 16, and November 29, 2001.





## **DRAFT Project Advisory Committee Meeting Notes**

**Project: SR-518 RDP & EA**

**Date of Meeting: 6-21-01**

**Location: Tukwila Community Center**

### **Project Advisory Committee**

**Meeting Purpose:** Project overview and Committee Input on draft project scope and schedule, corridor alternatives, screening criteria, public involvement plan, and secure commitment of the TAC to participate throughout the course of the project.

<b>Team Attendees</b>	<b>Representing</b>
Carol Hunter	WSDOT
Rob Spillar	PB
Steve Rolle	PB
Hiedi Stamm	HSPA
Brad Shinn	Norton Arnold & Janeway
Barry Knight	Transystems

<b>PAC Attendees</b>	<b>Representing</b>
Jerry Schultz	WSDOT/NW Region
Chris Picard	WSDOT/OUM
Ruce Rayburn	City of SeaTac
Dan Burke	Port of Seattle
Steve Clark	City of Burien
Doug Murdock	WSDOT/NW Region/PTER
Jeff Wong (Malva Slachowitz)	King County Transit/Harbor Development
Don Monaghan	City of SeaTac
Mark Leth	WSDOT/Traffic
Cayla Morgan	FAA-Seattle Airports District
David Kalberer	Port of Seattle
Lenard McGHee	Sound Transit
Brian Shelton	City of Tukwila
Craig Stone	WSDOT/South King County

<b>Action Items/ Requests</b>	<b>BY:</b>
<ul style="list-style-type: none"><li>Memo from cities of Burien and SeaTac on emerging land use issues that may relate to or have affect on RDP/EA</li><li>Clarify relationship between NEPA Document for SR 405 and SR 518</li><li>Contact FHWA to invite them to participate and to keep them informed</li><li>Minor Projects Memo identifying transportation projects that may affect the RDP or the SR 99 EA</li><li>Coordinate with FAA/Port on their discussions about projects</li><li>Invite an WSDOT/OSE representative</li><li>Discuss addressing Roadside Plan element in project</li><li>Provide ST open house schedule</li></ul>	<p>PAC Members</p> <p>Project Team- Rob and Carol</p> <p>Project Team- Carol</p> <p>PAC Members</p> <p>Project Team-Carol</p> <p>Project Team-Carol</p> <p>Jerry and Project Team</p> <p>Dan- ST</p>

Minutes 6-21-01 PAC Meeting.doc

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## Meeting Notes

- |  |                             |
|--|-----------------------------|
| • Provide contact lists to add to the data base  | PAC Members                 |
| • Clarify process approval schedule  | Project Team- Brad          |
| • Memo from PAC member indicating city council meeting dates that are suitable for RDP presentations, and their web site staff contact | PAC Members                 |
| • Work with Sound Transit and SeaTac/Riverton Heights and their outreach program to make presentations                                 | Project Team- Rob and Carol |
| • Provide Project Study Map to PAC   | Project Team- Steve         |
| • Invite New PAC members per suggestions   | Project Team- Rob and Carol |
| • Advance meeting notice and Information Packet  | Project Team- Hiedi         |

### Meeting General Summary

#### Project Purpose, Need, Scope and Schedule

##### Overview

- The RDP will present a vision of what the corridor will be like and develop alternatives to achieve that future
- The RDP/EA will identify infrastructure improvements to reasonably accommodate predicted growth of traffic
- Earlier Corridor Study helped identify Port development and establish the existing conditions for the corridor
- Traffic volumes in the SR-518 corridor are comparable to SR 520, though the peaking and distribution throughout the day differ
- No environmental documentation is required on RDP, but the project will follow the tenants of his process
- The RDP will formalize SR518 as a true corridor—the follow-on projects will have site specific documentation
- Not starting from scratch--We should think of this as Phase 2 of the SR 518 / SR 99 Corridor Study
- Results should improve traffic operation as well as access to surrounding communities and SeaTac Airport
- The RDP in many ways will resemble a “build-out plan”

##### Discussion and Questions

- Is the focus on highway improvements or will it include Sound Transit, Parking, bike-lanes, etc.?
- Parking and Operations at SW 154<sup>th</sup> should be part of the RDP
- The Plan should examine East-West arterial connections
- SeaTac and Burien land use conditions are changing, and need to be factored in
- It might be useful to think about and characterize these issues as “problems and needs”
- What are the funding sources for the RDP?
- Be sure not to preclude ST projects
- What is the action the state needs to take at the conclusion of the RDP?
- RDP should examine the corridor at the system level—lane balance, route continuity, basic lanes
- NEPA process keeps options open, including grants (NHS route)
- Coordination between I-405 and SR 518 needs careful attention
- WSDOT will complete a Deficiency Evaluation in November, that should be factored into this project
- ST’s interim terminal at 154<sup>th</sup> shouldn’t affect alignment, but pay close attention to corridor preservation
- Look for minor transportation projects that need to be coordinated/ integrated into planning

#### Project Assumptions

##### Overview

- JTS is the basis for traffic projections, some additional analysis may be necessary using the PSRC model.
- 2025 is designated the forecast year for the project.
- 509 extension and South Airport Access will be completed
- Light rail will be at 154<sup>th</sup>

### Discussion and Questions

- Why not extend the horizon to 2030 for consistency sake (with the regional model)
- There are difficulties with using any model. The PSRC cannot separate background traffic from airport specific traffic, while JTS can. Also, JTS is based on, and consistent with, the PSRC model
- Charlie Howard of FHWA should be part of the PAC
- Be sure to account for changes in land use from residential to warehouse type

### PAC Role

#### Overview

- PAC Role is to give advice, review and comment
- Help the team identify access needs
- Advise team on range of environmental issues that should be considered

### Discussion and Questions

- PAC meetings will be scheduled at critical points in the project, and will involve action items

### RDP/EA Public Involvement Plan

#### Overview

- Objective is to open a dialogue with the stakeholder to seek their input on alternatives and develop their support
- Stakeholders include the port, cities, transit and transportation agencies as well as local businesses, communities and commuters
- Key issues will be access for travelers, community access, and commuters, compatibility with planned development, freight mobility and construction impacts
- Communications in the plan depends on a PAC, public meetings and a variety of direct communications tools
- Key events that drive the plan are scoping, completion of the RDP and identification of the alternatives for SR 99 / SR 518 EA, and at completion of the EA and Preferred Alternative is selected

### Discussion and Questions

- Add corridor safety, Roadside Master Plan/Aesthetics as key issues and concerns
- Water quality and especially Miller Creek should be part of the RDP or at a minimum be consistent with what is being done on that project
- Don't let the RDP become a mystery—timing is important, don't wait until there are opinions formed
- Make presentations to councils, in conjunction with ST (regional express & 509) and Port-Riverton Heights outreach
- Provide links to cities' websites.
- Add airport users, freight and bicyclists as important stakeholders
- Look to 509 as a model for separating the project from peripheral issues
- Risks: Opponents of adjacent projects could attempt to link the RDP to other projects
- Plan an open house to coincide with the EA kickoff

### Screening Criteria

#### Overview

- Two level screening- Fatal Flaw and Operational analysis
- Criteria will be based on goals and objectives for the project-  
--Transportation operations (multi modal)

- Compatibility with other plans
- Safety
- Impact Avoidance
- Independent Utility

### Discussion and Questions

#### Corridor Concepts

##### Overview

- SR 509/ SR 518
  - No Build
  - Fully Directional interchange
  - Partially Directional
  - Integrated with SR 509 and S 146<sup>th</sup>
- SR 518/ Des Moines
  - No Build
  - Remove all access
  - Partial clover leaf
  - Integrate with SR 509- S 146<sup>th</sup> St interchange
- SR 518/S 154<sup>th</sup>/NAE/SR99
  - No Build
  - Single point urban interchange
  - Expanded cloverleaf/diamonds at SR 99
  - Full Access at 24<sup>th</sup> Ave. S, and modify current access
  - High Speed (large diameter) Roundabout
  - Collector distributor roads/integrated interchange
- I-5/I405 Interchange
  - No Build
  - Additional approach lanes to accommodate I-405 needs
  - Combine EB exits on right side with new flyover
  - HOV connections
  - Full Access to 51<sup>st</sup>
  - Separate airport/non-airport traffic
  - Complete rebuild of interchange separating directional movements

### Discussion and Questions

- Need to look at integrating 148<sup>th</sup> SW and SW 152<sup>nd</sup> with the SR-509/518 interchange.
- A SPUI at 509/518 is worth looking at
- At I-5/I405, it may be best to do nothing
- Backups on the east end of EB SR 518 may be due to congestion/bottlenecks on I-405
- The I-405 study doesn't look at the interchange—that is where the big question lies, how to integrate I-405 and SR 518
- Shouldn't there be an I-405 to SR 509 concept in the study—lets look at a basic lane structure for the corridor
- Do HOV lanes make any sense in this project?

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## Meeting Notes

- We should be looking not just at a little segment of the roadway, but the entire corridor, with consideration of lane balancing
- Watch out for drop and add lanes
- Could a freeway to freeway interchange work here?

### Future Meeting Schedule

#### Overview

- Wednesday June 27 at Corson- Lane Balance meeting with DEA
- Next PAC Meeting August 16, Tukwila Community Center, 9:30 am

#### Discussion and Questions

- Please mail out meeting packet in advance

<b>Copies to:</b>	Attendees	File					
<b>File No.:</b>							<b>Prepared by: Norton Arnold &amp; Janeway</b>



# **DRAFT Project Advisory Committee Meeting Notes**

**Project: SR-518 RDP & EA**

**Date of Meeting: 8-16-01**

**Location: Tukwila Community Center**

## **Project Advisory Committee**

**Meeting Purpose:** Review and Agree on 1<sup>st</sup> and 2<sup>nd</sup> level Corridor Screening Actions.

<b>Team Attendees</b>	<b>Representing</b>
Carol Hunter	WSDOT
Rob Spillar	PB
Steve Rolle	PB
Hiedi Stamm	HSPA
Brad Shinn	Norton Arnold & Janeway
Barry Knight	Transystems

<b>PAC Attendees</b>	<b>Representing</b>
Sally Anderson	WSDOT NW Region
Glen Chouinard	CH2M Hill/Port of Seattle
Dan Burke	Port of Seattle
Steve Clark	City of Burien
Doug Murdock	WSDOT/NW Region/PTER
Rod Kempkes	Sound Transit
Don Monaghan	City of SeaTac
Mark Leth	WSDOT/Traffic
Robin Tischmak	City of Tukwila
Craig Stone	WSDOT/South King County

<b>Action Items/ Requests</b>	<b>BY:</b>
• Meet with interested groups	Project Team - Rob and Carol
• Investigate possible Hydrocarbon plum report in area north of SR 99	Project Team - Rob and Carol
• Meet with Dan Burke of Sound Transit to Review Model differences and Demand projections	Project Team - Rob and Carol
• Distribute maps of the proposed new ramp to north bound I-5	Project Team - Rob and Carol
• Send out updated alternatives packages before Open house	Project Team - Rob and Carol

## **Meeting General Summary**

### **Project Update and Project Progress**

#### **Overview**

- Review Project Background, Purpose and Need, Scope and Schedule
- Presentation of Corridor Constraints

- Findings of First Level Screening
- First level Screening Recommendations
- Second level Screening process
- Description options
- Recommended option for each section of the corridor

### **Project Review:**

#### **Progress Scope and Schedule**

- WSDOT will make presentations to PAC members and other groups in the study area
- SR 518 Phase II – RDP Background
  - RDP wasn't part of original work
  - New projects and players changed some basic assumptions
    - I-405
    - Port Request to modify Access could change eastern and western actions on SR 518
    - Sound Transit Light Rail plans needed to be incorporated
    - Independent Utility for Central Section had to be established
  - The RDP as a specific Purpose and Need
    - Address central corridor access issues
    - Plan "link-ups" for I-405 improvements and Sound Transit Additions
    - Avoid environmental Impacts

#### **RDP Schedule**

- Agency and Community meetings have been set for October
  - The meetings will present the RDP and take comments on the plan, it will also serve as a scoping meeting for the SR 99/154<sup>th</sup>/24<sup>th</sup> Environmental Assessment
  - The format will be an open house presentation
- Evaluation of the options available at each of the focal points of the RDP is still underway
- Currently, we're looking at the options for their compatibility with SR 509, Des Moines Memorial Drive, and the I-5/I-405 interchange
- Still need to complete the detailed analysis of the SR 99/154<sup>th</sup>/24<sup>th</sup> interchange

### **Model Runs**

The assumptions we are using to build the models are what we call No Build and No Build Plus. No Build assumes no extension of SR 509 or the South Airport Express, but does assume Sound Transit's high capacity transit to the airport. No Build Plus includes the SR 509 extension and the South Airport Expressway. Using these assumptions, we have completed reconnaissance level analysis, looking at the following areas:

- Network Deficiencies – central components, capacity changes
- Environmental Constraints- no borings or delineated wetlands, just existing information

The analysis will not rise to the level of a SEPA/NEPA EA or even a checklist. The intent of the analysis is to:

- Expose fatal flaws
- Distinguish between concepts
- Identify major impacts

### **Constraints/Features**

#### West

Natural environment

- High topography

- Lined drainage
- Few wetlands

### Community

- Need to preserve option for gateway
- Visual/structural impacts of improvements
- Church nearby

### Hazardous materials

- Not significant
- May increase cost slightly

### Central

#### Natural environment

- Gilliam Creek, Miller Creek and Lora lake
- No fish impacts, but small wetland
- Small detention facility

#### Zoning

- FAA restrictions
- Wildlife attractions
- Concentration of people
- OFA

#### Geologic

- Peat soils
- Significant fill with some slope failures

### Eastern

#### Natural environment

- Open channels
- Gilliam Creek - fish present

#### Community

- Parcels close to Right-of-Way

#### Geologic

- Severe slope failure
- Watered Soils

### **Traffic**

- Eastern and western sections operate differently
- All sections analyzed for three categories of Level of Service—A-C (operating well), D-E (potential for break down), and F (not acceptable)

### West

- Eastern half (especially east bound) is heavily affected by traditional a.m. and p.m. peak hour demand
- The eastern section is a mix of service levels under both No-Build and No-build Plus scenarios
- East and west bound between SR 99 and I-405 are LOS F in the p.m., a.m. is mixed between D-F
- Unique peaking spreads demand over longer period
- Most problems appear to be a result of combined airport access and commute

### East

- The western half of the corridor will operate acceptable in the a.m. regardless of the no-build scenario. Severs levels drop down to middle of the service levels during the p.m. in both scenarios, but greater in the westbound under the No-Build.



### Discussion and Questions

- Can the EA be expanded to the entire corridor?
- With the No Build Plus option there seems to be higher demand on the ramps—shouldn't that be reduced as a result of adding the SR 509 extension?
- Does the No-Build and No-Build Plus include Sound Transit (ST) Access? It would help ST if they knew the impact of not building transit.
- Can you quantify the improvement in traffic as a result of ST?
- ST will have a decision on August 27<sup>th</sup>, currently the only obstacle is the Port of Seattle Development Plan

### Alternative Concepts

#### West Section

SR 509/SR 518

#### Major issues/concerns

- Preserve entry to Burien
- Two major freeways coming together
- Staging of improvements

#### Concept Analysis

- Single Point Urban Interchange (SPUI)
- Reduced signals
- No additional restrictions on existing movement

#### Recommendation

- Hybrid with signal improvements from SR 518 to SR 509 north
- Couplet
- SPUI concept
- Staged construction

#### Advantages

- Improved traffic operations
- Good driver expectations
- Meets gateway needs for Burien (north to west access is below grade, so there is a good plane of view)

#### Impacts

- Some southern residential
- Removal/replacement of the off ramp from north SR 509 to west SR 518

#### Discussion and Questions

- Probably don't need east bound SPUI access?
- Will the east bound grade be ok if there are stacking problems?
- Is there sufficient room for all of these options?
- Could freeway to freeway access still be added after 2025?

#### Des Moines Memorial Drive

#### Major issues/concerns

- Preserve ?what?

#### Concept Analysis

- Current land use precludes removal
- Intersection needs to be coordinated with SR 509 improvements
- Completely within the CAA, some environmental constraints
- 2025 combination still works well
- Changes to interchange would transfer impacts to central section of corridor

### Recommendation

- No additional improvements

### East Section

#### I-5/I405 Tukwila

#### Major issues/concerns

- High volume moving to airport
- North I-5 access on left
- Weave is a major problem on east bound section, but too long for weave analysis
- North bound I-5 to west bound SR 518 is a problem geometrically

#### Concept Analysis

- Two lane through I-5 interchange to I-405
- South I-5 access to remain on right
- Added lanes

#### Recommendation

- Add a second lane through the Tukwila interchange as system management improvement
- Move left sided SR 518 to northbound I-5 to right side, possibly combine with southbound as a single exit, coordinated with 51<sup>st</sup> Ave. Reserve the Left ramp for HOV access.
- Add third eastbound lane from airport access ramp
- Widen ramps to and from I-5 for lane balance

#### Advantages

- Better driver expectation
- Smoother flow from Airport access
- Less chance of backup through the interchange to I-405

#### Discussion and Questions

- What is happening on the 99 ramp—is it also trying to get left?
- The RDP should state that any future work on the I-5 to SR 518 should build on this analysis.
- Is there a need for additional HOV lanes?
- Consider the long-term implications of express lanes in both directions on SR 518.
- There is a big question of independent utility in the discussion of the interchange and the third lane on eastbound SR 518.
- Adding a lane through the interchange may be problematic to get Federal approval.

### Central Corridor

#### SR 99/S 154<sup>th</sup> St./24<sup>th</sup> Ave. S.

*This section is entirely preliminary and will gain detail as part of the Environmental Assessment*

#### Major issues/concerns

- Added capacity

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## **Meeting Notes**

- Unlikely that new additional ramps would be allowed
- Combined ramps don't improve operations
- Moving ramps from 154<sup>th</sup> to 24<sup>th</sup> would show improvements, but C/D street and connections to the North Airport Expressway would be needed

### Recommendation

- Currently examining split frontage or "barbell" concept

### Discussion and Questions

- Does the frontage/barbell concept try to analyze two concepts as one?
- Will you evaluate the operational impacts to SR 99?
- The distance limitation between ramps does not limit other jurisdictions, why not here?
- Signalization doubling will hinder operations.
- Do you have accurate data on the new volume carried on 24<sup>th</sup> as a result of these changes?
- You should look at the east west through movement.
- What are the impacts to and from the North Airport Expressway and rental car facilities?

### **Next PAC meeting When?**



# **DRAFT Project Advisory Committee Meeting Notes**

**Project: SR-518 RDP & EA**

**Date of Meeting: 11-29-01**

**Location: Tukwila Community Center**

## **Project Advisory Committee**

**Meeting Purpose:** Review of project actions and findings; review of proposed schedule revision; review and recommend SR 99/24<sup>th</sup> Ave. access “build alternative” for inclusion in EIS.

<b>Team Attendees</b>	<b>Representing</b>
Carol Hunter	WSDOT
Rob Spillar	PB
Steve Rolle	PB
Hiedi Stamm	HSPA
Chris Hoffman	Norton Arnold & Janeway
Barry Knight	Transystems

<b>PAC Attendees</b>	<b>Representing</b>
Sally Anderson	WSDOT NW Region
Glen Chouinard	CH2M Hill/ Port of Seattle
Dan Burke	Port of Seattle
Steve Clark	City of Burien
Doug Murdock	WSDOT/NW Region/PTER
Rod Kempkes	Sound Transit
Don Monaghan	City of SeaTac
Mark Leth	WSDOT/Traffic
Robin Tischmak	City of Tukwila
Craig Stone	WSDOT/South King County

<b>Action Items/ Requests</b>	<b>BY:</b>
<ul style="list-style-type: none"><li>Achieve support from the PAC for the SR 518 Route Development Plan/ Environmental Assessment.</li></ul>	Project Team- Rob and Carol

## **Meeting General Summary**

### **Project Update and Open House Summary**

#### **Overview**

- Both the Agency and the Public Open House were successful
- Received four agency comments
- Forty members of the public attended the open house
- Thirty-five written comments were received from the public
- In general, most comments were supportive – most comments pertained to specific ramps/access points

- The most recent meeting with the SR 99/24<sup>th</sup> Ave. access stakeholders honed in on three concepts (two of these were shared at the public meeting, the third is a recent development)
- In general, a split diamond does not meet needs on SR 99; two alternatives should be carried into the EA
- The end product will likely be a blend of these two
- The Executive Summary for the RDP is intended to be a stand-alone document (a small correction was noted on page 2)

### Findings of route Development Plan

#### Overview

- Focused on three interchanges – west, central and east
- Traffic conditions forecasted for 2025
- West end functions better than east end with the exception of the SR 509 ramps
- East end is defined by SR 99 and I-5 problems
- West end has most constraints (wetlands, FAA restrictive zones)
- Central section has fewest constraints (some wetlands, small portion of FAA zone, and Sound Transit alignment)
- East end has significant constraints (steep slopes and wetlands)

#### *West End Recommended Concepts*

- See EX-3 and EX-4 in the Executive Summary for details
- SR 509/518 interchange has a number of options, including the construction of a direct access ramp from 509 to SR 518
- Do nothing at DMMD because demand is not there and there are too many constraints
- A good arterial system is needed in the area under do nothing alternative

#### *Central Section Recommended Concepts*

- See EX-5 in the Executive Summary for details
- Two of the three alternatives selected for the 24<sup>th</sup> Avenue S./Airport/SR 99 Interchange are being recommended for the EA
- The Split Diamond Alternative (#1) has enough problems to remove it from consideration
- Consensus on the acceptability of the other two is needed
- The Modified Split Diamond/Loop Alternative (#2) is a little more inconvenient than #1, and has the following characteristics:
  - No blocking problems
  - Level of Service C
  - Higher delay for eastbound ramps onto SR 518
  - Lower delay onto SR 99
  - 154<sup>th</sup> remains arterial
- Phased Combined Diamond/SPUI Alternative (#3) is not much different in performance than Alternative #2, and has the following characteristics:
  - Slightly lower level of service than Alternatives #1 and #2
  - Access from 24<sup>th</sup> St. E has to be tied in some other way
  - Necessitates a 3<sup>rd</sup> lane on SR 518 eastbound
  - Does not have delay issues that Alternative #2 has
- Under each alternative SR 99 needs to be widened to 8-9 lanes
- Both alternatives #2 and #3 need further analysis in the EA

- Need full access at 24<sup>th</sup> and SR 99
- Need to look at connection down the hill
- Cost are comparable between #2 and #3
- Third lane on SR 518 is not included in the costs for either alternative

### *East Section Recommended Concepts*

- See EX-6 in the Executive Summary for details
- There are lots of options within the concept that need further analysis
- Some offer improvements that will have immediate benefits (second eastbound lane tol-405 under I-5 and a 3<sup>rd</sup> lane downhill eastbound from SR 99)
- Extend 2<sup>nd</sup> eastbound lane from under I-5 onto I-405
- Add 3<sup>rd</sup> eastbound lane from the airport and consolidate off ramps connecting to I-5 north and south
- Move northbound I-5 access from SR 518 E to right side and connect it to I-5 with an overpass (alleviates weaving problem)

## Discussion and Questions

### *West End*

- Recheck constraint on one bridge furthest east (Figure EX-4)
- Are we at stage for an EA on SR509/SR 518?
- We need to work together on an agreement for funding

### *Central Section*

- Has the JTS been adopted?
- Not yet
- We need to work off of adopted plans. It is difficult to move on without the JTS being adopted
- The JTS model uses a different methodology than our forecasting tool
- The one we used is more conservative than JTS model
- We came up with higher estimates for future traffic
- With either model, our recommendation does not change
- The Port of Seattle is interested in at least looking at the possibility of adding eastbound access to SR 518 from the airport in both alternatives
- None of the improvements address SR 518 problems; just adding access to an already congested roadway
- Why is an EA with two alternatives necessary? It seems choosing one now for further analysis is less complicated
- Continued analysis of both alternatives is necessary regardless. We need the NEPA process of looking at both even though transportation issues for both might be the same
- In order to eventually arrive at some combination of #2 and #3 we have to have both in EA
- We need to know if both are viable, and if both are viable they have to be brought through the process
- If a 3<sup>rd</sup> lane is added eastbound on SR 518 from the airport will that trigger an EIS?
- It is likely that there is existing WSDOT right-of-way there, so an EIS might not be required
- Sequencing will be important: I-405 improvements need to happen before SR 518 improvements
- There needs to be continued partnership conversations between WSDOT and the Port of Seattle

### *East End*

- Concerned that a 3<sup>rd</sup> eastbound lane from the airport under I-5 has been tried before, and that it has not worked out because of lack of space under I-5 and sight line problems merging onto I-405

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## Meeting Notes

- We believe there is enough space under I-5, but we will look more closely at it. The sight line problem would be addressed by extending the merge lane further east on I-405
- Concerned that the RDP results are superceding the recommendations in the HOV Predesign Study
- We need to line up HOV connections on the right side of SR 518 to make those connections to the airport work. We will identify HOV Predesign recommendations in RDP, and clarify HOV connections

### *General*

- Can we close the RDP with two alternatives for the EA?
- Concerned that there will be a loss of flexibility if we go to EA process
- In effect, we are already in the EA process and we are flexible
- As long as the process is flexible – that modifications can be made to the alternatives the Port of Seattle has no objection to the EA
- We are at the right place to make a decision on the RDP/EA, and want to move onto the next phase in order to be in concert with I-405
- The PAC supports the RDP and has reached consensus on carrying alternatives #2 and #3 into the EA.
- Consensus that there will be more analysis on both alternatives, new access options will be looked into, and that there will be partnership discussions regarding next steps and implementation

### **Next Steps**

#### **Overview**

- The project schedule has slipped by one to two months
- We need access decision report to coincide with the EA
- Project partners need to step back with WSDOT to determine if the project is scoped properly
- We need to fold the Port's access needs into the process
- A short break (about six weeks) for the PAC will allow us to put the house in order so we can move onto next steps
- PB recommends communicating back to the PAC via email or mail in late January regarding the partnership discussions and to provide the EA schedule
- All PAC members present agreed on this approach to next steps

---

## ***Meeting Notes***

<b>Copies to:</b>	Attendees	File				
<b>File No.:</b>						<b>Prepared by: Norton Arnold &amp; Janeway</b>



## Appendix F – Open House Notices and Advance Materials

Following are materials that were mailed and distributed in advance of the October 10, 2001 SR 518 Open House and Agency Meetings.

**Where & When:**

Wed, Oct. 10, 2001  
6:00 p.m. to 8:00 p.m.  
Highline High School Cafeteria  
225 South 152nd St., Burien

**For More Information:**

Carol Hunter  
Washington State Department of  
Transportation  
(206) 464-6231  
Email: [HunterC@wsdot.wa.gov](mailto:HunterC@wsdot.wa.gov)



Carol Hunter  
Washington State Department of Transportation  
401 2<sup>nd</sup> Ave South., # 300  
Seattle, WA 98104

# Come to a Public Open House for SR 518 Route Development

**Future Plans and Proposed Project**

WSDOT is holding an Open House as an opportunity for the community to learn about and comment on the long-range transportation improvements planned for the SR 518 corridor, as well as comment on the scope of a subsequent Environmental Assessment for improvements identified in the vicinity of SR 99 and S 154<sup>th</sup> Street / 24<sup>th</sup> Avenue S that are slated for initial implementation.

While many of the proposed improvements are long-term plans, proposed actions at S 154<sup>th</sup> Street/24<sup>th</sup> Avenue S and SR 99 could move forward immediately with an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). This meeting is an opportunity for government agencies, tribes, businesses, and the general public to comment on the scope of the EA.

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**What:**

An Open House to discuss long-range plans for SR 518 and receive comments on the scope of the upcoming Environmental Assessment for improvements at S 154<sup>th</sup> St / 24<sup>th</sup> Avenue S and SR 99. The meeting is being held by The Washington State Department of Transportation (WSDOT) in coordination with King County, Port of Seattle, Sound Transit and the Cities of Burien, SeaTac, and Tukwila.

**When & Where:**

Wed, Oct. 10, 2001  
6:00 p.m. to 8:00 p.m.  
Highline High School  
Cafeteria  
225 South 152nd St.  
Burien

**How to Get There:**

From Des Moines Memorial Drive take 152<sup>nd</sup> St east to Highline High School on left. Follow signs to the project Open House

**For More Information:**

Carol Hunter,  
Washington State  
Department of  
Transportation  
401 2<sup>nd</sup> Ave South., # 300  
Seattle, WA 98104  
(206) 464-6231  
FAX: (206) 464-6084  
Email:  
HunterC@wsdot.wa.gov

## NOTICE OF OPEN HOUSE AND SCOPING MEETING - SR 518

### Future Plans and Proposed Project

WSDOT is holding an Open House as an opportunity for the community to learn about and comment on long-range transportation improvements planned for the SR 518 corridor, as well comment on the scope of a subsequent Environmental Assessment for improvements identified in the vicinity of SR 99 and S 154<sup>th</sup> Street / 24<sup>th</sup> Avenue S that are slated for initial implementation.

A Route Development Plan (RDP) is being developed for SR 518 that will establish a long-range vision for the corridor that is intended to meet transportation needs through the year 2025. Elements of the SR 518 Route Development Plan recommendations are:

- Improved access and operations at the SR 509/ SR 518 interchange
- Improved access to and from SR 99, the North Airport Expressway, and in the vicinity of S 154<sup>th</sup> Street / 24<sup>th</sup> Avenue S.
- Increased capacity on SR 518 between SR 99 and the I-5 interchange
- Improved access to I-405 and I-5

While many of the proposed improvements are long-term plans, proposed actions at S 154<sup>th</sup> Street/24<sup>th</sup> Avenue South and SR 99 will move forward immediately to be analyzed in a National Environmental Policy Act (NEPA) Environmental Assessment (EA). This meeting is an opportunity for government agencies, tribes, and the general public to comment on the scope of the EA.

The improvements to be studied in the EA would provide full access between the arterial network and SR 518 in the vicinity of SR 99 and S 154<sup>th</sup> Street / 24<sup>th</sup> Avenue S. The proposal relocates the 154<sup>th</sup> Street ramps to 24<sup>th</sup> Avenue South, and reconfigures the SR 99 ramps to improve alignment and operations. Full access would be provided through connections between the two partial interchanges or by additional direct access to the SR 518 mainline.

### Public Access to Meeting

The site is accessible to persons with disabilities. Individuals requiring reasonable accommodation may request written materials in alternative formats, sign language interpreters, physical accessibility accommodations, or other reasonable accommodation by calling Ben Brown; collect at (206) 440-4528, or the WSDOT ADA Accommodation Hotline (collect) at (206) 389-2839. Persons with hearing impairments may access WA State Telecommunications Relay Service (TTY) at 1-800-833-6388, or Tele-Braille at 1-800-833-6385, or Voice at 1-800-833-6384, and ask to be connected to (360) 705-7097.

WSDOT assures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination based on race, color, national origin, and sex in the provision of benefits and services.

# SR 518

## Route Development



### SR 518 Route Development Plan: Planning For The Future

SR 518 is a major, limited-access state highway connecting SR 509 in Burien to I-405 and I-5 in Tukwila. SR 518 is also the primary route to and from SeaTac Airport. The Washington State Department of Transportation (WSDOT) is studying the corridor to identify projects that should be undertaken in order to meet travel needs over the next 25 years.

### Public Open House October 10 at Highline High School

WSDOT invites the community to an Open House to learn about and comment on long-range transportation improvements planned for the SR 518 corridor, in addition, the community is invited to comment on the scope of a subsequent Environmental Assessment (EA) for improvements identified for the SR 99 and S 154<sup>th</sup> Street / 24<sup>th</sup> Avenue S interchange.

Community members will have an opportunity to talk with the project team to learn about the Route Development Plan (RDP) and the proposed EA and provide input into the RDP that is being completed for the corridor. Additionally, comments regarding the scope of the Environmental Assessment for the proposed actions at S 154<sup>th</sup> Street/24<sup>th</sup> Avenue South and SR 99 will be sought.

### SR 518 Corridor *Fast Facts*

#### Regional and Local Improvements already underway

- South Airport Expressway
- SR 509 Extension
- I-405 Programmatic EIS
- Link Lightrail to Seatac
- International Boulevard Phase III
- SeaTac Expansion

#### Trends

- The travel demand forecast model uses a 2.98% per year employment growth and 2.54% population growth.
- Most growth in the corridor results from changing land use.

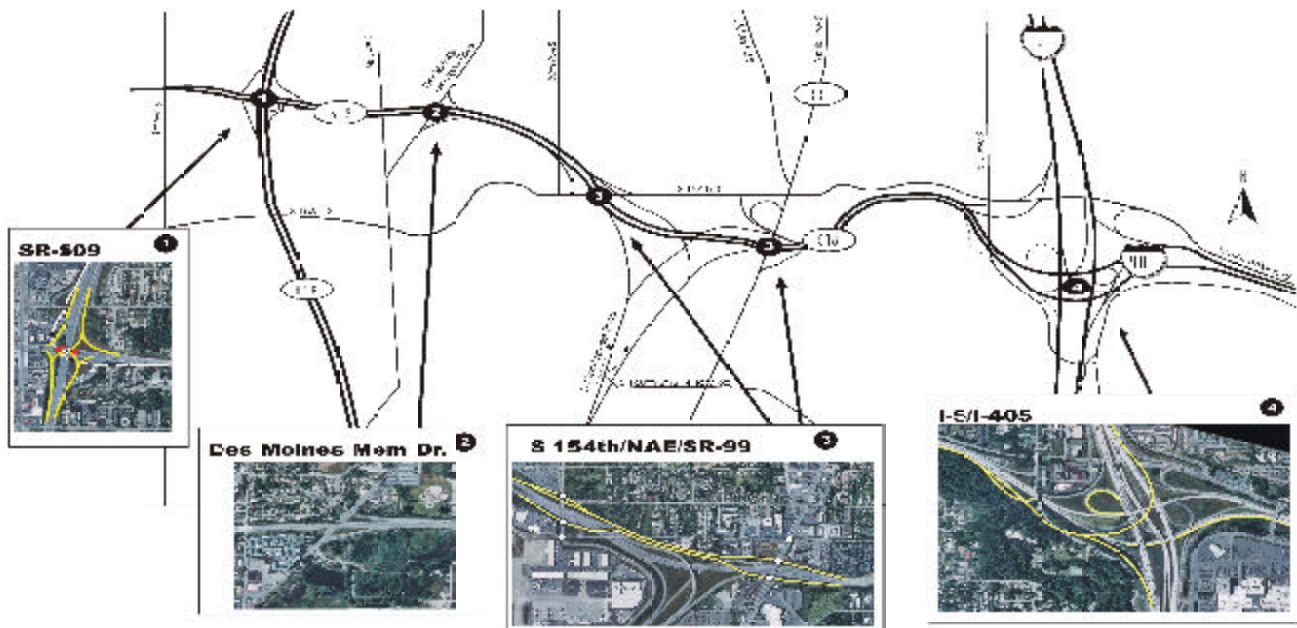
#### Where & When:

Wed., Oct. 10, 2001  
6:00 p.m. to 8:00 p.m.  
Highline High School  
Cafeteria  
225 South 152nd St.  
Burien

#### How to Get There:

From Des Moines Memorial Drive take 152<sup>nd</sup> St east to Highline High School on left. Follow signs to the project Open House

## SR-518 RDP: Concepts



### RDP 1 SR 509

- Realignment of the northbound to westbound, and westbound to south bound ramps to a signal
- Reconstruction of the existing SR 518 overpass at SR 509 to accommodate revised ramps
- Build a fly-under ramp from south bound SR 509 to eastbound SR 518 for better access to SeaTac air port from the north
- Acquisition of additional right-of-way in the southeast quadrant of the interchange and potential some acquisition just west of the SR 509 alignment
- Potential signal operation modification at S. 148th St. and along 1st Ave. S for better access to Burien

### RDP 2 Des Moines Memorial Drive

- No Changes

### RDP 3 SR 99 Interchange

- The improvements to be evaluated in the EA would provide full access between the arterial network and SR 518 in the vicinity of SR 99 and S 154th Street / 24th Avenue S.
- Relocating the 154th Street ramps to 24th Avenue South
- Reconfiguring the SR 99 ramps to improve operations
- Providing full access through connections between the two partial interchanges or by additional direct access to the SR 518 mainline

### RDP 4 Tukwila Interchange

- Add a second lane to SR 518 through Tukwila, connecting at Andover Park
- Move the eastbound SR 518 to North bound I-5 exit to the right side of SR 518; consider combining with the I-5 south bound access as a single exit
- Build a third eastbound lane from the airport access on-ramp to the re-aligned I-5 ramp
- Widen appropriate ramps to and from I-5

## Project Background

In 1998, WSDOT began studying present and future needs for the SR 518 corridor. The first phase of the work evaluated the current and forecast levels of traffic, which were compared to the designed capacity of the highway, ramps, and adjacent intersections. The study also evaluated traffic accident data to help identify problem areas.

Earlier this year, WSDOT began phase two, which involves preparing a Route Development Plan (RDP) for the entire corridor, as well as completing an Environmental Assessment for projects proposed on SR 518 near 24<sup>th</sup> Avenue S / S 154<sup>th</sup> Street and SR 99. The RDP identifies distinct projects at a conceptual level to address specific deficiencies or needs in the corridor. While the RDP does identify major constraints to avoid or minimize environmental impacts, it does not involve a detailed examination of the impacts or provide specific design-level analysis. Essentially, the level of decision making in an RDP is limited to determining the kinds of projects that have the best potential to meet the future needs of the corridor.

## What is a Route Development Plan?

The RDP is a long-range planning exercise, intended to plan for traffic levels forecast up to 25 years into the future. By projecting future traffic conditions along an entire corridor, planners can analyze how efficiently roadways, interchanges and other components work together as a system. The RDP is meant to be a “big picture” view; it should identify the types of improvements a corridor will need if it is to remain functional for all current and projected uses. The RDP can be updated as assumptions about future forecasts become more certain or change. By planning now, the best options for meeting future needs can be established early and adjusted as necessary.

## What the SR 518 RDP will do:

- Match specific traffic or operational needs with concepts to address those needs
- Identify projects that could improve access to and from SR 518
- Propose projects that are compatible with planned developments in Burien, SeaTac and Tukwila, as well as other transportation plans developed by WSDOT, King County (Metro Transit), and Sound Transit
- Identify projects that could improve safety
- Identify phasing options allowing improvements to be constructed as necessary, and when funding is available

## What the RDP won't do:

- Evaluate the environmental impacts of specific projects.
- Propose improvements that depend on other, additional projects to meet project goals.
- Develop finalized plans for recommended concepts.

# NOTICE OF OPEN HOUSE AND SCOPING MEETING SR 518

## Future Plans and Proposed Project

WSDOT is holding an Open House for the community to learn about and comment on long-range transportation improvements planned for the SR 518 corridor, and to comment on the scope of a subsequent Environmental Assessment for improvements identified in the vicinity of SR 99 and S 154<sup>th</sup> Street / 24<sup>th</sup> Avenue S that are slated for initial implementation.

A Route Development Plan (RDP) is being developed for SR 518 to establish a long-range vision that is intended to meet transportation needs for the corridor through the year 2025. Elements of the SR 518 Route Development Plan recommendations are:

- Improved access and operations at the SR 509/ SR 518 interchange
- Improved access to and from SR 99, the North Airport Expressway, and in the vicinity of S 154<sup>th</sup> Street / 24<sup>th</sup> Avenue S
- Increased capacity on SR 518 between SR 99 and the I-5 interchange
- Improved access to I-405 and I-5

## For More Information:

**Where & When:**  
Wed. Oct. 10, 2001  
6:00 p.m. to 8:00 p.m.  
Highline High School  
Cafeteria  
225 South 152nd St.  
Burien, WA

Carol Hunter  
Washington State Department  
of Transportation  
401 2<sup>nd</sup> Ave South, # 300  
Seattle, WA 98104  
(206) 464-6231  
FAX: (206) 464-6084  
Email:  
HunterC@wsdot.wa.gov



**Washington State  
Department of Transportation**

401 2nd Ave. South, #300  
Seattle, WA 98104-2887

Indecia

Contact Address

**Don't Forget!! Public Open House  
October 10, 6:00-8:30 PM Highline High School Cafeterium**



## Appendix F – Open House Handouts

Following is information handed out to attendees of the Agency Meeting and Open House held on October 10, 2001.



## WHAT IS THE SR 518 ROUTE DEVELOPMENT PLAN (RDP)?

**A RDP provides a long-range plan for a transportation corridor, setting forth a conceptual framework for future improvements. It allows local and regional governments to efficiently plan construction over a twenty-year planning horizon. It is intended to identify infrastructure improvements necessary to reasonably accommodate anticipated traffic growth.**

**The SR 518 RDP will propose *recommended concepts* for improvements to the interchanges along SR 518. These are intended as preliminary concepts only. Each recommendation will need to complete a formal *Environmental Assessment* before being finalized.**

**An Environmental Assessment is currently being planned for proposed improvements at the S 154<sup>th</sup> Street/Airport/SR 99 interchanges. Implementation of improvements at other locations along the corridor will depend on prioritization and funding.**

**The purpose of this Open House is to present the recommendations and to obtain feedback. The RDP is scheduled to be finalized by the end of this year, at which time the Environmental Assessment for the S 154<sup>th</sup> Street/Airport/SR 99 interchanges will begin. Another Open House focusing on this Environmental Assessment is planned for the spring of 2002.**



## What We Want From You Tonight

1. **Questions**
2. **Concerns, comments, and feedback about the *Recommended Concept* at each interchange**
3. **Ideas for improvements to the S 154th Street/24th Avenue S and the SR 99 interchanges**

⇒ **Please provide written feedback by:**

- **Filling out the comments sheet at the end of this packet and leaving it here tonight or returning by mail by October 24<sup>th</sup>.**
- **Writing comments on the flip-charts provided in each exhibit area**
- **Writing comments on the post-its provided in the last exhibit area and attaching to the maps.**



## SR 518 RDP Open House

**Tonight's open house is arranged as a series of exhibit areas. An outline of the exhibits is presented below.**

### WELCOME AREA

- Aerial photograph of the corridor
- Sign-in and handouts

### OVERVIEW AREA

- Introduction to the SR 518 Route Development Plan (RDP)
- RDP Purpose & Need
- Anticipated traffic conditions along SR 518 by the year 2025 if no action is taken to improve the corridor.

### INTERCHANGE AREAS

- **SR 509 & Des Moines Memorial Drive**
  - Improvement concepts considered
  - Constraints & Issues
  - Recommended Concept for the RDP
- **51st Avenue S & I-5/I-405 (Tukwila Interchange)**
  - Improvement concepts considered
  - Constraints & Issues
  - Recommended Concept for the RDP
- **S 154th Street / Airport / SR 99**
  - Improvement concepts considered
  - Constraints & Issues
  - Comments/Feedback Area

### WHAT'S NEXT?

- Process and timeline for completion of the RDP and for an Environmental Assessment for improvements at the S 154th Street/Airport/SR 99 interchanges.

## Recommended Concepts

### SR 509 INTERCHANGE



- *Replace two signals with a single signal*
- *Direct freeway-to freeway ramps (without signals) for traffic from and to the north*
- *May add direct ramp for traffic to the south if required at later date*

### DES MOINES MEMORIAL DRIVE INTERCHANGE

- *No action recommended at this time*

### S 154th Street / Airport / SR 99 INTERCHANGES

- *Move the S 154th Street interchange to 24th Avenue S*
- *Improve access at the SR 99 interchange*
- *Tie the 24th Avenue S and SR 99 interchanges together with C-D or frontage roads*
- *Airport ramps remain as they are now*
- *Concepts still under development*
- *Environmental Assessment over the next 12 months*

## TUKWILA INTERCHANGE



- *Extend a 2<sup>nd</sup> EB lane under the I-5 interchange*
- *Move the left-side offramp to NB I-5 over to the right side of SR 518*
- *Construct a 3rd EB lane from the Airport to the new I-5 exit ramp*
- *Widen the loop ramp to SB I-5*

## WHAT'S NEXT/TIMELINE

- SR 518 RDP to be completed November 2001
- SR 518 RDP governmental review December 2001
- Open House for the Environmental Assessment of improvements at the S 154th Street / Airport / SR 99 interchanges May 2002
- Environmental Review of improvements at other locations along SR 518 to be scheduled pending funding

## INFORMATION OR QUESTIONS

For updates on the SR 518 RDP or Environmental Assessment, please contact the Project Manager:

Carol Hunter  
 WSDOT Urban Corridors Office  
 401 2<sup>nd</sup> Avenue, #300  
 Seattle, WA 98104-2887  
 206-464-6231  
[hunterc@wsdot.wa.gov](mailto:hunterc@wsdot.wa.gov)



**FOR COMING AND FOR PROVIDING US WITH YOUR  
COMMENTS AND FEEDBACK**

[illegible]

Carol Hunter  
WSDOT Urban Corridors Office  
401 2<sup>nd</sup> Avenue, #300  
Seattle, WA 98104-2887

## Appendix F – Open House Summary

Following is a summary of the October 10, 2001 Open House and Agency Meetings.

# **SR 518 RDP OPEN HOUSE AND SR-99 TO S. 154<sup>TH</sup> ST/24<sup>TH</sup> AVE. S EA SCOPING MEETING**

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## **MEETING SUMMARY AND SUMMARY OF COMMENTS**

WSDOT and its consultants have been preparing a Route Development Plan for SR 518. The RDP identifies major improvements that would reasonably accommodate anticipated traffic growth through 2030. The Department presented the draft RDP at an open house meeting for both agency and public comment and review. The purpose of the Open house was to present the recommended project concepts made in the RDP and obtain community feedback. Site specific environmental analysis will be needed before any of the recommendation in the RDP can be constructed. One improvement recommended in the RDP to begin immediately is the SR-99 to S. 154<sup>th</sup> St/24<sup>th</sup> Ave S project. A scoping meeting for the Environmental Assessment (EA) for this project was combined with the open house.

The project team presented information on the development, analysis, progress, and key decision points for the RDP. Approximately 30 display boards were arranged to guide meeting participants through the project purpose and need, the existing and projected levels of service, as well as the corridor's environmental constraints. Four stations described the range of solution concepts considered and the recommended concept for each interchange area. A separate station described the SR-99 to S. 154<sup>th</sup> St/24<sup>th</sup> Ave S proposed action to be evaluated in the Environmental Assessment. A final board described the process and timeline for completion of the RDP.

Both agency and public open house/scoping meetings were held October 10<sup>th</sup>. The agency meeting was attended by eleven agency staff representing EPA, Ecology, WSDOT, King County Water & Land Resource Division, Port of Seattle, and the cities of Burien, SeaTac, and Tukwila. Nearly fifty people attended the public meeting later in the evening. As community members signed in, they were asked to indicate on a map where they live and where they work to provide a general indication of interest within the project area. During both meetings, WSDOT staff and consultants were available to answer questions and explain the RDP and EA. Comment cards for both the RDP and EA were available in several locations throughout the presentation.

## **COMMENT SUMMARY**

### **Agency**

Primary among the agency meeting's four comments were that appropriate consideration was given to coordinating projects recommended in the RDP with other



planned projects, especially Sound Transit's light rail, the SR 509 Extension and the South Airport Expressway. A secondary concern expressed in agency comments reflected the need to coordinate closely with the three cities in the project area to ensure that traffic patterns and access match projected and planned land use. No comments were received that indicated an inappropriate level of planning and analysis.

## **Public Comments**

Most comments were concerned with improved access and mobility, especial at SR-99 to S. 154<sup>th</sup> St/24<sup>th</sup> Ave S, but also connections to I-5 and I-405 on and off ramps and merging on to SR 518 eastbound from the North Airport Expressway. Comments were also received that raised how construction of the RDP recommended projects would be managed in light of the proposed Third Runway project. Issues raised were related to project construction sequencing and delays, environmental constraints, and air quality. A small number of public comments touched on the coordination with other planned projects, especially light rail. Written public comments totaled 15, four of which were specific to the scope of the EA.